

005001 0291E200

Uncoupled - <i>Desired</i>				Decoupled - <i>Acceptable</i>				Coupled - <i>Undesired</i>			
	DP1 DP2 DP3				DP1 DP2 DP3				DP1 DP2 DP3		
	ER1	X	0	0	X	0	0		ER1	X	X
	ER2	0	X	0	X	X	0		ER2	X	X
	ER3	0	0	X	X	X	X		ER3	X	X

FIGURE 2

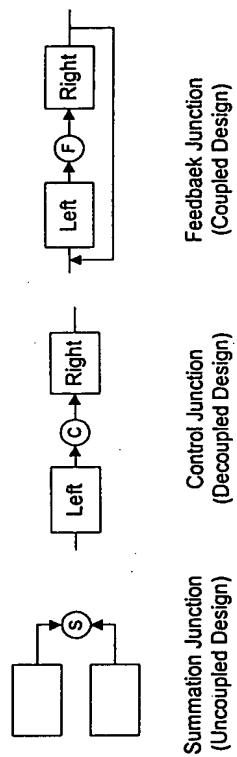


FIGURE 3

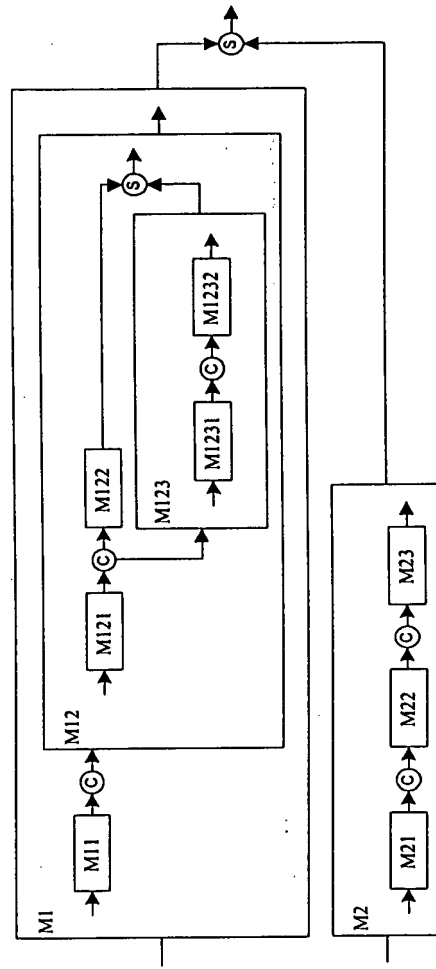


FIGURE 4

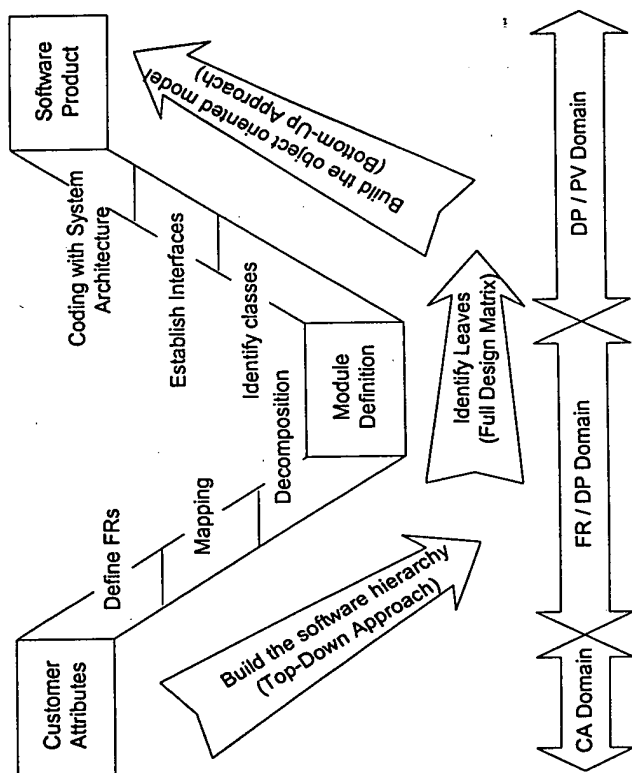


FIGURE 5

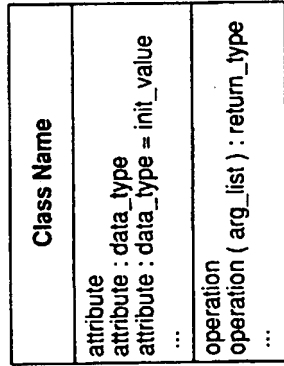
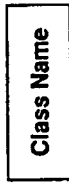
005027 025FE200

Object (= FR)
Attributes/ Data Structure (= DP)
Method (FRi = Aji DPj)

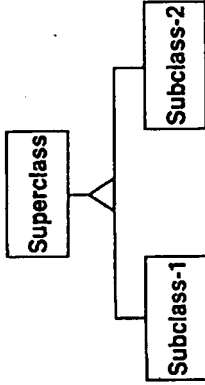
FIGURE 6

DD9027-6297E400

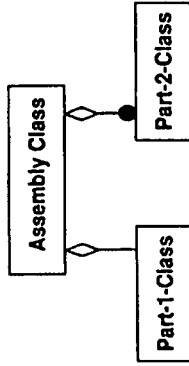
Class:



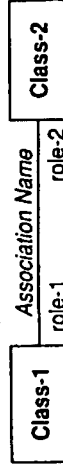
Generalization (Inheritance):



Aggregation:



Association:



Multiplicity of Associations:

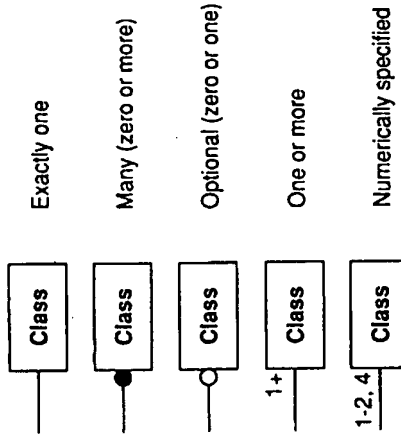


FIGURE 7

000007-02515600

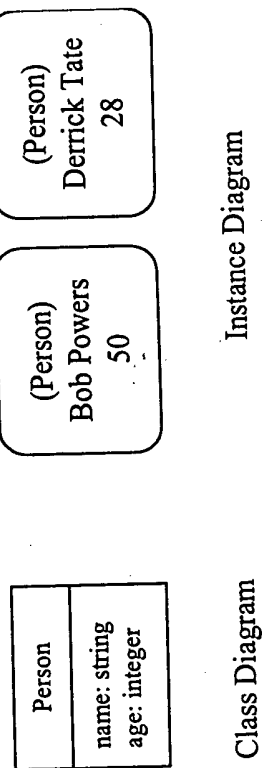


FIGURE 9

003027 029 FEB 60

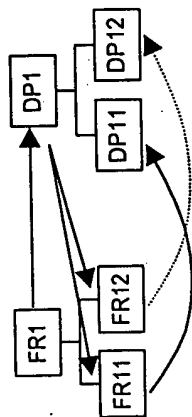


FIGURE 10

005021 829FE2DD

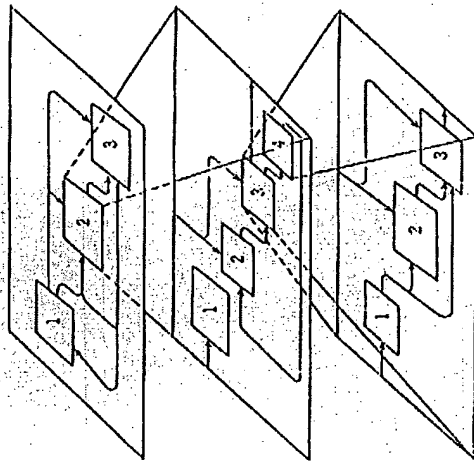


FIGURE 11

$$\left\{ \begin{array}{l} \text{FR1: Define Component} \\ \text{FR2: Set something} \\ \text{FR3: Do Something} \end{array} \right\} = \left\{ \begin{array}{l} X \quad 0 \quad 0 \\ X \quad X \quad 0 \\ X \quad X \quad X \end{array} \right\} \left\{ \begin{array}{l} \text{DP1: Attributes} \\ \text{DP2: Action A} \\ \text{DP3: Action B} \end{array} \right\}$$

These two attributes are used by all methods

The number of total attributes are 4 for this class.

	DP1: Attributes	DP2: Action A	DP3: Action B
FR1: Define component	uPortPinsUp		
FR2: Set something	uPinsUpSensor	SetState()	Module for FR2
FR3: Do something	uStatus	X	Module for FR3
	uTime	ProcessLoop()	

This attribute is only used by `setState()` method.

ProcessLoop() method calls **SetState()** method.

FIGURE 12

OBJECT 225 F400

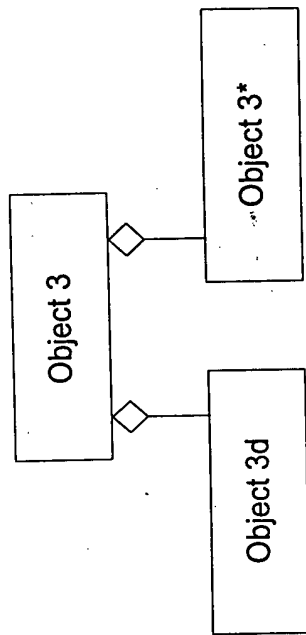
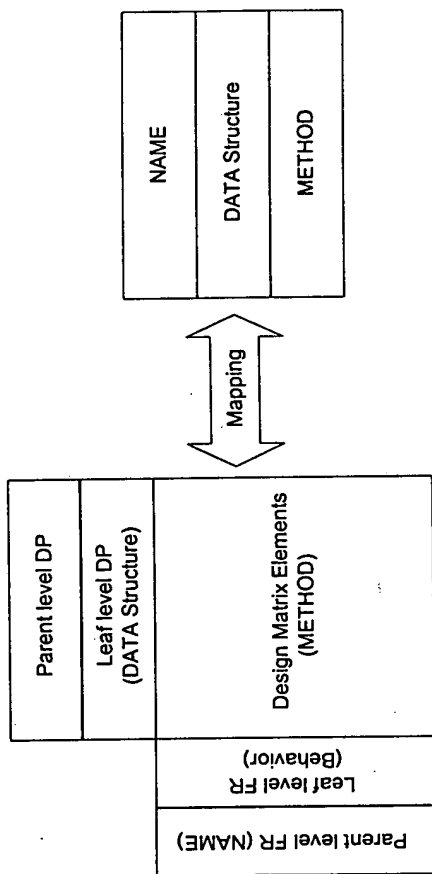


FIGURE 14



(a) Full Design Matrix Table

(b) Class Diagram

FIGURE 15

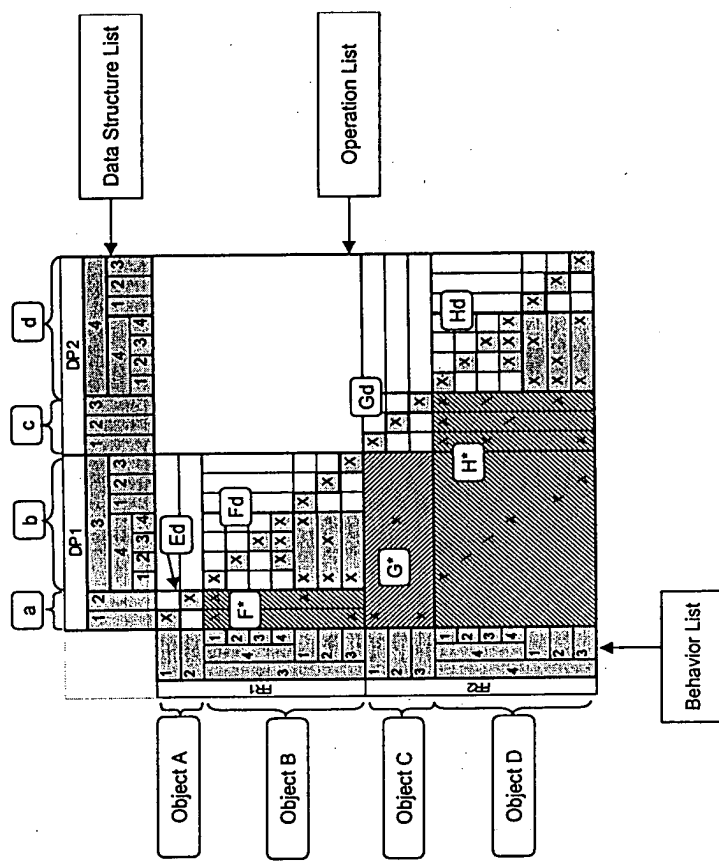


FIGURE 16

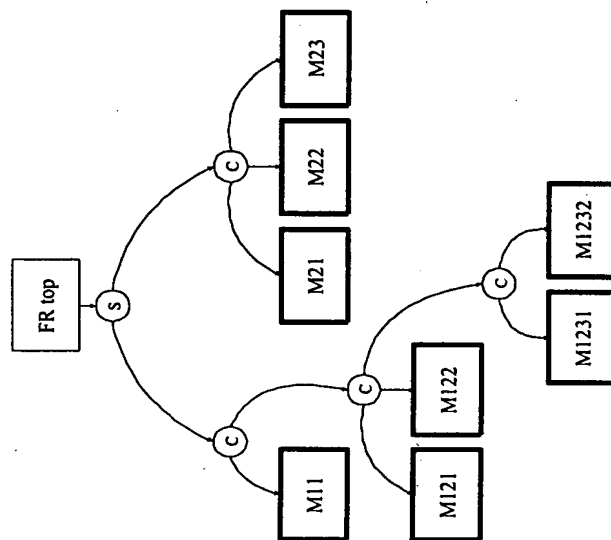


FIGURE 18

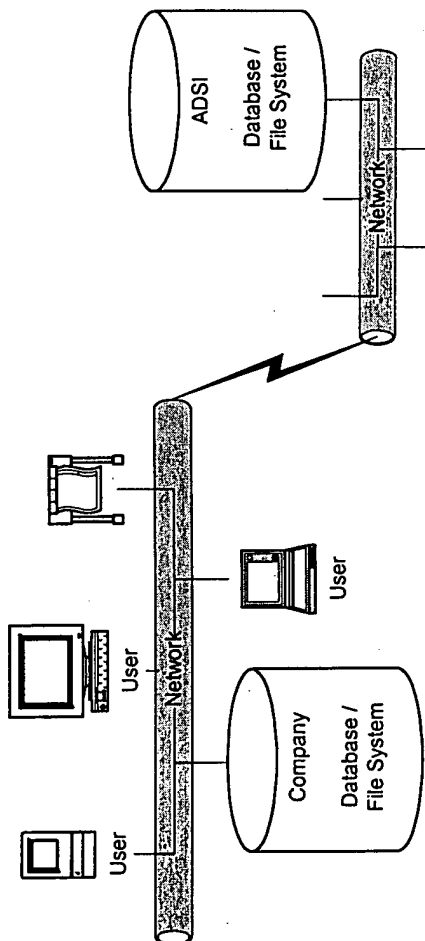


FIGURE 19

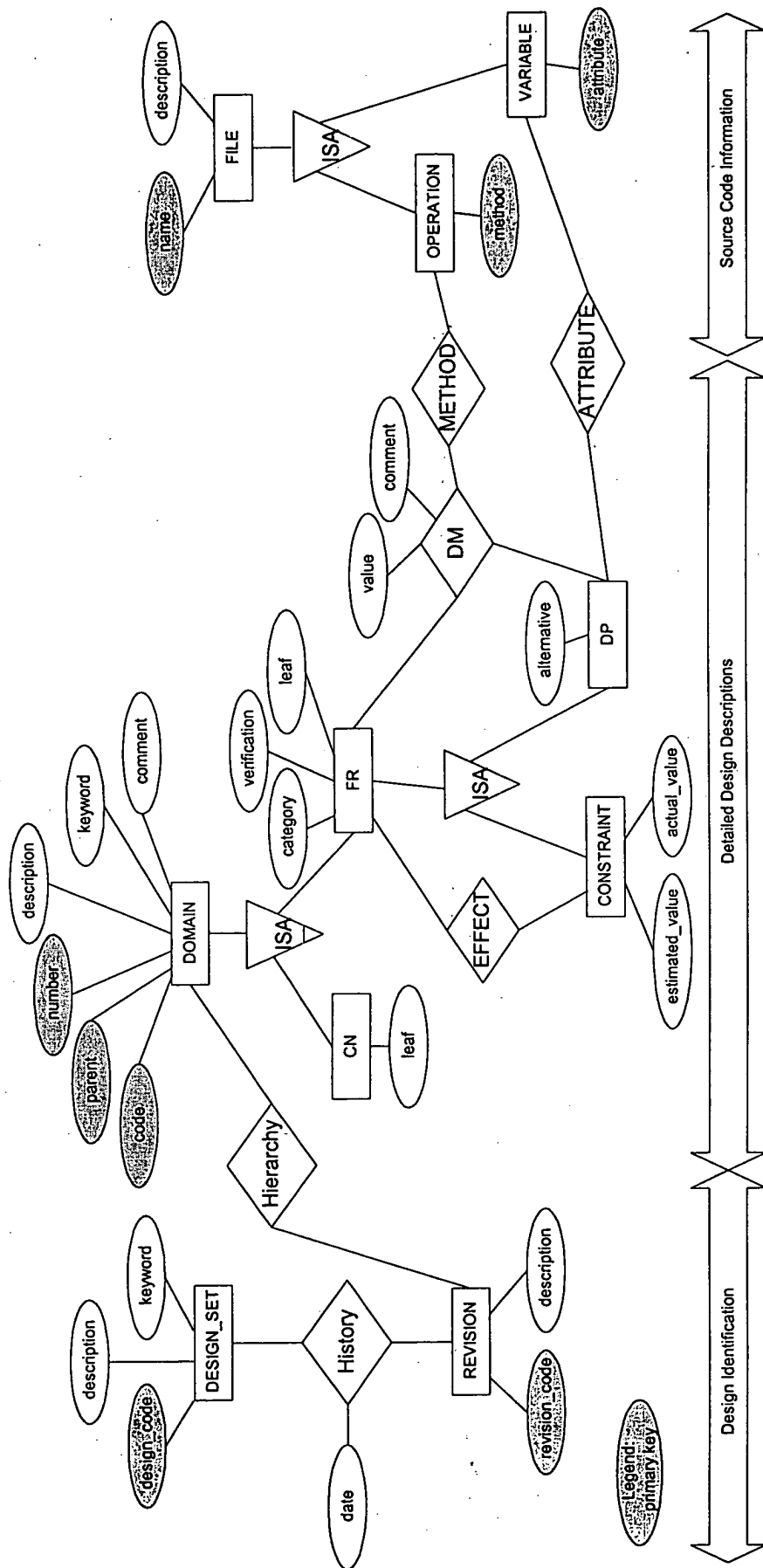


FIGURE 20

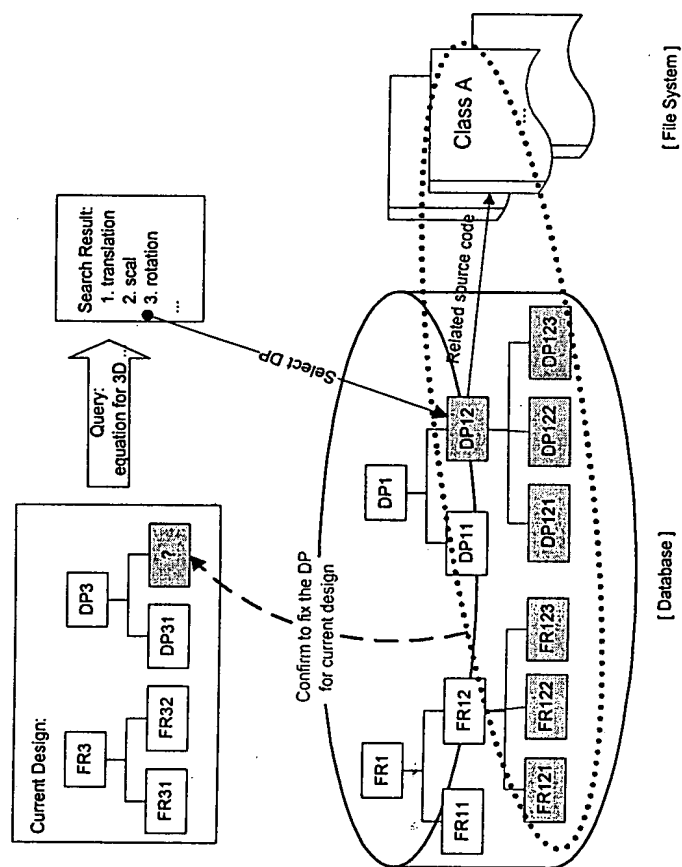


FIGURE 21

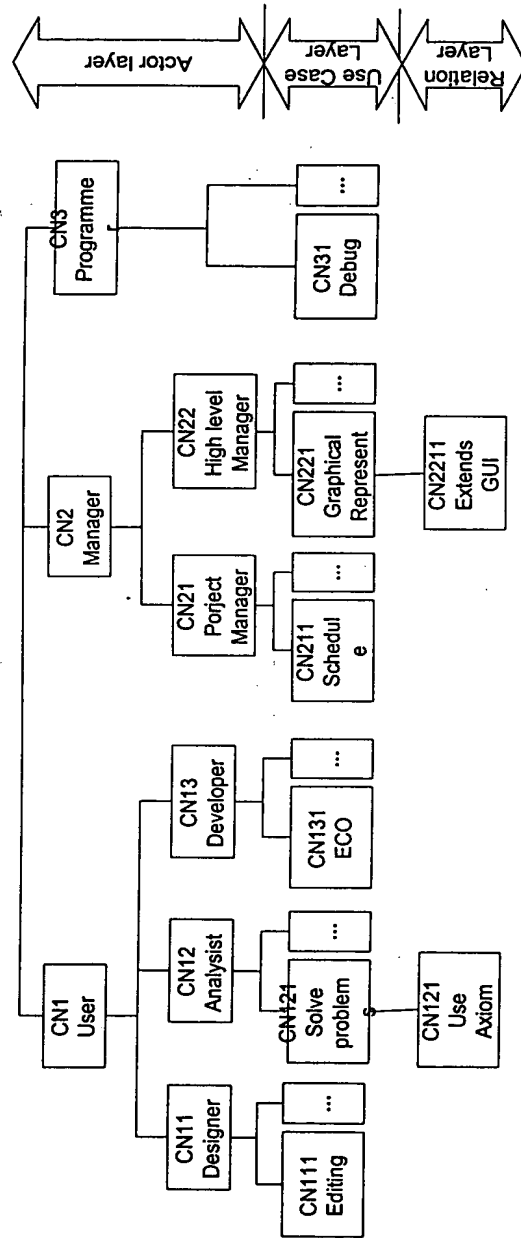


FIGURE 22

005001 0297E100

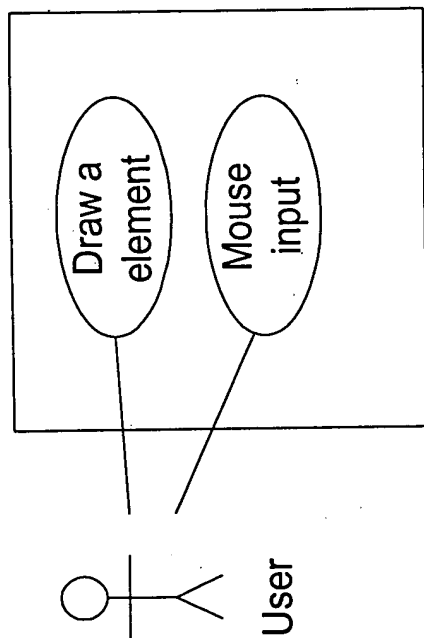


FIGURE 24



DP1: Element characteristics			DP2: GUI with window																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
FR1: Define element	FR2: Specify drawing	FR11: Define line element	FR12: Define rectangle element	FR13: Define circle element	FR21: Identify the drawing type	FR22: Detect drawing location	FR23: Draw the element	DP11: Line characteristics						DP12: Rectangle characteristics						DP13: Circle characteristics						DP21: Radio buttons						DP22: Mouse click information						DP23: Drawing area																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
								DP111: Start point	DP112: End point	DP121: Upper left point	DP122: Lower right point	DP131: Center point	DP132: Radius	DP211: Line button	DP212: Rectangle button	DP213: Circle button	DP221: Event for push	DP222: Event for release	DP231: Start point	DP232: End point	DP233: Upper left point	DP234: Lower right point	DP235: Center point	DP236: Radius	DP237: Line button	DP238: Rectangle button	DP239: Circle button	DP241: Event for push	DP242: Event for release	DP243: Start point	DP244: End point	DP245: Upper left point	DP246: Lower right point	DP247: Center point	DP248: Radius	DP249: Line button	DP250: Rectangle button	DP251: Circle button	DP252: Event for push	DP253: Event for release	DP254: Start point	DP255: End point	DP256: Upper left point	DP257: Lower right point	DP258: Center point	DP259: Radius	DP260: Line button	DP261: Rectangle button	DP262: Circle button	DP263: Event for push	DP264: Event for release	DP265: Start point	DP266: End point	DP267: Upper left point	DP268: Lower right point	DP269: Center point	DP270: Radius	DP271: Line button	DP272: Rectangle button	DP273: Circle button	DP274: Event for push	DP275: Event for release	DP276: Start point	DP277: End point	DP278: Upper left point	DP279: Lower right point	DP280: Center point	DP281: Radius	DP282: Line button	DP283: Rectangle button	DP284: Circle button	DP285: Event for push	DP286: Event for release	DP287: Start point	DP288: End point	DP289: Upper left point	DP290: Lower right point	DP291: Center point	DP292: Radius	DP293: Line button	DP294: Rectangle button	DP295: Circle button	DP296: Event for push	DP297: Event for release	DP298: Start point	DP299: End point	DP300: Upper left point	DP301: Lower right point	DP302: Center point	DP303: Radius	DP304: Line button	DP305: Rectangle button	DP306: Circle button	DP307: Event for push	DP308: Event for release	DP309: Start point	DP310: End point	DP311: Upper left point	DP312: Lower right point	DP313: Center point	DP314: Radius	DP315: Line button	DP316: Rectangle button	DP317: Circle button	DP318: Event for push	DP319: Event for release	DP320: Start point	DP321: End point	DP322: Upper left point	DP323: Lower right point	DP324: Center point	DP325: Radius	DP326: Line button	DP327: Rectangle button	DP328: Circle button	DP329: Event for push	DP330: Event for release	DP331: Start point	DP332: End point	DP333: Upper left point	DP334: Lower right point	DP335: Center point	DP336: Radius	DP337: Line button	DP338: Rectangle button	DP339: Circle button	DP340: Event for push	DP341: Event for release	DP342: Start point	DP343: End point	DP344: Upper left point	DP345: Lower right point	DP346: Center point	DP347: Radius	DP348: Line button	DP349: Rectangle button	DP350: Circle button	DP351: Event for push	DP352: Event for release	DP353: Start point	DP354: End point	DP355: Upper left point	DP356: Lower right point	DP357: Center point	DP358: Radius	DP359: Line button	DP360: Rectangle button	DP361: Circle button	DP362: Event for push	DP363: Event for release	DP364: Start point	DP365: End point	DP366: Upper left point	DP367: Lower right point	DP368: Center point	DP369: Radius	DP370: Line button	DP371: Rectangle button	DP372: Circle button	DP373: Event for push	DP374: Event for release	DP375: Start point	DP376: End point	DP377: Upper left point	DP378: Lower right point	DP379: Center point	DP380: Radius	DP381: Line button	DP382: Rectangle button	DP383: Circle button	DP384: Event for push	DP385: Event for release	DP386: Start point	DP387: End point	DP388: Upper left point	DP389: Lower right point	DP390: Center point	DP391: Radius	DP392: Line button	DP393: Rectangle button	DP394: Circle button	DP395: Event for push	DP396: Event for release	DP397: Start point	DP398: End point	DP399: Upper left point	DP400: Lower right point	DP401: Center point	DP402: Radius	DP403: Line button	DP404: Rectangle button	DP405: Circle button	DP406: Event for push	DP407: Event for release	DP408: Start point	DP409: End point	DP410: Upper left point	DP411: Lower right point	DP412: Center point	DP413: Radius	DP414: Line button	DP415: Rectangle button	DP416: Circle button	DP417: Event for push	DP418: Event for release	DP419: Start point	DP420: End point	DP421: Upper left point	DP422: Lower right point	DP423: Center point	DP424: Radius	DP425: Line button	DP426: Rectangle button	DP427: Circle button	DP428: Event for push	DP429: Event for release	DP430: Start point	DP431: End point	DP432: Upper left point	DP433: Lower right point	DP434: Center point	DP435: Radius	DP436: Line button	DP437: Rectangle button	DP438: Circle button	DP439: Event for push	DP440: Event for release	DP441: Start point	DP442: End point	DP443: Upper left point	DP444: Lower right point	DP445: Center point	DP446: Radius	DP447: Line button	DP448: Rectangle button	DP449: Circle button	DP450: Event for push	DP451: Event for release	DP452: Start point	DP453: End point	DP454: Upper left point	DP455: Lower right point	DP456: Center point	DP457: Radius	DP458: Line button	DP459: Rectangle button	DP460: Circle button	DP461: Event for push	DP462: Event for release	DP463: Start point	DP464: End point	DP465: Upper left point	DP466: Lower right point	DP467: Center point	DP468: Radius	DP469: Line button	DP470: Rectangle button	DP471: Circle button	DP472: Event for push	DP473: Event for release	DP474: Start point	DP475: End point	DP476: Upper left point	DP477: Lower right point	DP478: Center point	DP479: Radius	DP480: Line button	DP481: Rectangle button	DP482: Circle button	DP483: Event for push	DP484: Event for release	DP485: Start point	DP486: End point	DP487: Upper left point	DP488: Lower right point	DP489: Center point	DP490: Radius	DP491: Line button	DP492: Rectangle button	DP493: Circle button	DP494: Event for push	DP495: Event for release	DP496: Start point	DP497: End point	DP498: Upper left point	DP499: Lower right point	DP500: Center point	DP501: Radius	DP502: Line button	DP503: Rectangle button	DP504: Circle button	DP505: Event for push	DP506: Event for release	DP507: Start point	DP508: End point	DP509: Upper left point	DP510: Lower right point	DP511: Center point	DP512: Radius	DP513: Line button	DP514: Rectangle button	DP515: Circle button	DP516: Event for push	DP517: Event for release	DP518: Start point	DP519: End point	DP520: Upper left point	DP521: Lower right point	DP522: Center point	DP523: Radius	DP524: Line button	DP525: Rectangle button	DP526: Circle button	DP527: Event for push	DP528: Event for release	DP529: Start point	DP530: End point	DP531: Upper left point	DP532: Lower right point	DP533: Center point	DP534: Radius	DP535: Line button	DP536: Rectangle button	DP537: Circle button	DP538: Event for push	DP539: Event for release	DP540: Start point	DP541: End point	DP542: Upper left point	DP543: Lower right point	DP544: Center point	DP545: Radius	DP546: Line button	DP547: Rectangle button	DP548: Circle button	DP549: Event for push	DP550: Event for release	DP551: Start point	DP552: End point	DP553: Upper left point	DP554: Lower right point	DP555: Center point	DP556: Radius	DP557: Line button	DP558: Rectangle button	DP559: Circle button	DP560: Event for push	DP561: Event for release	DP562: Start point	DP563: End point	DP564: Upper left point	DP565: Lower right point	DP566: Center point	DP567: Radius	DP568: Line button	DP569: Rectangle button	DP570: Circle button	DP571: Event for push	DP572: Event for release	DP573: Start point	DP574: End point	DP575: Upper left point	DP576: Lower right point	DP577: Center point	DP578: Radius	DP579: Line button	DP580: Rectangle button	DP581: Circle button	DP582: Event for push	DP583: Event for release	DP584: Start point	DP585: End point	DP586: Upper left point	DP587: Lower right point	DP588: Center point	DP589: Radius	DP590: Line button	DP591: Rectangle button	DP592: Circle button	DP593: Event for push	DP594: Event for release	DP595: Start point	DP596: End point	DP597: Upper left point	DP598: Lower right point	DP599: Center point	DP600: Radius	DP601: Line button	DP602: Rectangle button	DP603: Circle button	DP604: Event for push	DP605: Event for release	DP606: Start point	DP607: End point	DP608: Upper left point	DP609: Lower right point	DP610: Center point	DP611: Radius	DP612: Line button	DP613: Rectangle button	DP614: Circle button	DP615: Event for push	DP616: Event for release	DP617: Start point	DP618: End point	DP619: Upper left point	DP620: Lower right point	DP621: Center point	DP622: Radius	DP623: Line button	DP624: Rectangle button	DP625: Circle button	DP626: Event for push	DP627: Event for release	DP628: Start point	DP629: End point	DP630: Upper left point	DP631: Lower right point	DP632: Center point	DP633: Radius	DP634: Line button	DP635: Rectangle button	DP636: Circle button	DP637: Event for push	DP638: Event for release	DP639: Start point	DP640: End point	DP641: Upper left point	DP642: Lower right point	DP643: Center point	DP644: Radius	DP645: Line button	DP646: Rectangle button	DP647: Circle button	DP648: Event for push	DP649: Event for release	DP650: Start point	DP651: End point	DP652: Upper left point	DP653: Lower right point	DP654: Center point	DP655: Radius	DP656: Line button	DP657: Rectangle button	DP658: Circle button	DP659: Event for push	DP660: Event for release	DP661: Start point	DP662: End point	DP663: Upper left point	DP664: Lower right point	DP665: Center point	DP666: Radius	DP667: Line button	DP668: Rectangle button	DP669: Circle button	DP670: Event for push	DP671: Event for release	DP672: Start point	DP673: End point	DP674: Upper left point	DP675: Lower right point	DP676: Center point	DP677: Radius	DP678: Line button	DP679: Rectangle button	DP680: Circle button	DP681: Event for push	DP682: Event for release	DP683: Start point	DP684: End point	DP685: Upper left point	DP686: Lower right point	DP687: Center point	DP688: Radius	DP689: Line button	DP690: Rectangle button	DP691: Circle button	DP692: Event for push	DP693: Event for release	DP694: Start point	DP695: End point	DP696: Upper left point	DP697: Lower right point	DP698: Center point	DP699: Radius	DP700: Line button	DP701: Rectangle button	DP702: Circle button	DP703: Event for push	DP704: Event for release	DP705: Start point	DP706: End point	DP707: Upper left point	DP708: Lower right point	DP709: Center point	DP710: Radius	DP711: Line button	DP712: Rectangle button	DP713: Circle button	DP714: Event for push	DP715: Event for release	DP716: Start point	DP717: End point	DP718: Upper left point	DP719: Lower right point	DP720: Center point	DP721: Radius	DP722: Line button	DP723: Rectangle button	DP724: Circle button	DP725: Event for push	DP726: Event for release	DP727: Start point	DP728: End point	DP729: Upper left point	DP730: Lower right point	DP731: Center point	DP732: Radius	DP733: Line button	DP734: Rectangle button	DP735: Circle button	DP736: Event for push	DP737: Event for release	DP738: Start point	DP739: End point	DP740: Upper left point	DP741: Lower right point	DP742: Center point	DP743: Radius	DP744: Line button	DP745: Rectangle button	DP746: Circle button	DP747: Event for push	DP748: Event for release	DP749: Start point	DP750: End point	DP751: Upper left point	DP752: Lower right point	DP753: Center point	DP754: Radius	DP755: Line button	DP756: Rectangle button	DP757: Circle button	DP758: Event for push	DP759: Event for release	DP760: Start point	DP761: End point	DP762: Upper left point	DP763: Lower right point	DP764: Center point	DP765: Radius	DP766: Line button	DP767: Rectangle button	DP768: Circle button	DP769: Event for push	DP770: Event for release	DP771: Start point	DP772: End point	DP773: Upper left point	DP774: Lower right point	DP775: Center point	DP776: Radius	DP777: Line button	DP778: Rectangle button	DP779: Circle button	DP780: Event for push	DP781: Event for release	DP782: Start point	DP783: End point	DP784: Upper left point	DP785: Lower right point	DP786: Center point	DP787: Radius	DP788: Line button	DP789: Rectangle button	DP790: Circle button	DP791: Event for push	DP792: Event for release	DP793: Start point	DP794: End point	DP795: Upper left point	DP796: Lower right point	DP797: Center point	DP798: Radius	DP799: Line button	DP800: Rectangle button	DP801: Circle button	DP802: Event for push	DP803: Event for release	DP804: Start point	DP805: End point	DP806: Upper left point	DP807: Lower right point	DP808: Center point	DP809: Radius	DP810: Line button	DP811: Rectangle button	DP812: Circle button	DP813: Event for push	DP814: Event for release	DP815: Start point	DP816: End point	DP817: Upper left point	DP818: Lower right point	DP819: Center point	DP820: Radius	DP821: Line button	DP822: Rectangle button	DP823: Circle button	DP824: Event for push	DP825: Event for release	DP826: Start point	DP827: End point	DP828: Upper left point	DP829: Lower right point	DP830: Center point	DP831: Radius	DP832: Line button	DP833: Rectangle button	DP834: Circle button	DP835: Event for push	DP836: Event for release	DP837: Start point	DP838: End point	DP839: Upper left point	DP840: Lower right point	DP841: Center point	DP842: Radius	DP843: Line button	DP844: Rectangle button	DP845: Circle button	DP846: Event for push	DP847: Event for release	DP848: Start point	DP849: End point	DP850: Upper left point	DP851: Lower right point	DP852: Center point	DP853: Radius	DP854: Line button	DP855: Rectangle button	DP856: Circle button	DP857: Event for push	DP858: Event for release	DP859: Start point	DP860: End point	DP861: Upper left point	DP862: Lower right point	DP863: Center point	DP864: Radius	DP865: Line button	DP866: Rectangle button	DP867: Circle button	DP868: Event for push	DP869: Event for release	DP870: Start point	DP871: End point	DP872: Upper left point	DP873: Lower right point	DP874: Center point	DP875: Radius	DP876: Line button	DP877: Rectangle button	DP878: Circle button	DP879: Event for push	DP880: Event for release	DP881: Start point	DP882: End point	DP883: Upper left point	DP884: Lower right point	DP885: Center point	DP886: Radius	DP887: Line button	DP888: Rectangle button	DP889: Circle button	DP890: Event for push	DP891: Event for release	DP892: Start point	DP893: End point	DP894: Upper left point	DP895: Lower right point	DP896: Center point	DP897: Radius	DP898: Line button	DP899: Rectangle button	DP900: Circle button	DP901: Event for push	DP902: Event for release	DP903: Start point	DP904: End point	DP905: Upper left point	DP906: Lower right point	DP907: Center point	DP908: Radius	DP909: Line button	DP910: Rectangle button	DP911: Circle button	DP912: Event for push	DP913: Event for release	DP914: Start point	DP915: End point	DP916: Upper left point	DP917: Lower right point	DP918: Center point	DP919: Radius	DP920: Line button	DP921: Rectangle button	DP922: Circle button	DP923: Event for push	DP924: Event for release	DP925: Start point	DP926: End point	DP927: Upper left point	DP928: Lower right point	DP929: Center point	DP930: Radius	DP931: Line button	DP932: Rectangle button	DP933: Circle button	DP934: Event for push	DP935: Event for release	DP936: Start point	DP937: End point	DP938: Upper left point	DP939: Lower right point	DP940: Center point	DP941: Radius	DP942: Line button	DP943: Rectangle button	DP944: Circle button	DP945: Event for push	DP946: Event for release	DP947: Start point	DP948: End point	DP949: Upper left point	DP950: Lower right point	DP951: Center point	DP952: Radius	DP953: Line button	DP954: Rectangle button	DP955: Circle button	DP956: Event for push	DP957: Event for release	DP958: Start point	DP959: End point	DP960: Upper left point	DP961: Lower right point	DP962: Center point	DP963: Radius	DP964: Line button	DP965: Rectangle button	DP966: Circle button	DP967: Event for push	DP968: Event for release	DP969: Start point	DP970: End point	DP971: Upper left point	DP972: Lower right point	DP973: Center point	DP974: Radius	DP975: Line button	DP976: Rectangle button	DP977: Circle button	DP978: Event for push	DP979: Event for release	DP980: Start point	DP981: End point	DP982: Upper left point	DP983: Lower right point	DP984: Center point	DP985: Radius	DP986: Line button	DP987: Rectangle button	DP988: Circle button	DP989: Event for push	DP990: Event for release	DP991: Start point	DP992: End point	DP993: Upper left point	DP994: Lower right point	DP995: Center point	DP996: Radius	DP997: Line button	DP998: Rectangle button	DP999: Circle button	DP1000: Event for push	DP1001: Event for release	DP1002: Start point	DP1003: End point	DP1004: Upper left point	DP1005: Lower right point	DP1006: Center point	DP1007: Radius	DP1008: Line button	DP1009: Rectangle button	DP1010: Circle button	DP1011: Event for push	DP1012: Event for release	DP1013: Start point	DP1014: End point	DP1015: Upper left point	DP1016: Lower right point	DP1017: Center point	DP1018: Radius	DP1019: Line button	DP1020: Rectangle button	DP1021: Circle button	DP1022: Event for push	DP1023: Event for release	DP1024: Start point	DP1025: End point	DP1026: Upper left point	DP1027: Lower right point	DP1028: Center point	DP1029: Radius	DP1030: Line button	DP1031: Rectangle button	DP1032: Circle button	DP1033: Event for push	DP1034: Event for release	DP1035: Start point	DP1036: End point	DP1037: Upper left point	DP1038: Lower right point	DP1039: Center point	DP1040: Radius	DP1041: Line button	DP1042: Rectangle button	DP1043: Circle button	DP1044: Event for push	DP1045: Event for release	DP1046: Start point	DP1047: End point	DP1048: Upper left point	DP1049: Lower right point	DP1050: Center point	DP1051: Radius	DP1052: Line button	DP1053: Rectangle button	DP1054: Circle button	DP1055: Event for push	DP1056: Event for release	DP1057: Start point	DP1058: End point	DP1059: Upper left point	DP1060: Lower right point	DP1061: Center point	DP1062: Radius	DP1063: Line button	DP1064: Rectangle button	DP1065: Circle button	DP1066: Event for push	DP1067: Event for release	DP1068: Start point	DP1069: End point	DP1070: Upper left point	DP1071: Lower right point	DP1072: Center point	DP1073: Radius	DP1074: Line button	DP1075: Rectangle button	DP1076: Circle button	DP1077: Event for push	DP1078: Event for release	DP1079: Start point	DP1080: End point	DP1081: Upper left point	DP1082: Lower right point	DP1083: Center point	DP1084: Radius	DP1085: Line button	DP1086: Rectangle button	DP1087: Circle button	DP1088: Event for push	DP1089: Event for release	DP1090: Start point	DP1091: End point	DP1092: Upper left point	DP1093: Lower right point	DP1094: Center point	DP1095: Radius	DP1096: Line button	DP1097: Rectangle button	DP1098: Circle button	DP1099: Event for push	DP1100: Event for release	DP1101: Start point	DP1102: End point	DP1103: Upper left point	DP1104: Lower right point	DP1105: Center point	DP1106: Radius	DP1107: Line button	DP1108: Rectangle button	DP1109: Circle button	DP1110: Event for push	DP1111: Event for release	DP1112: Start point	DP1113: End point	DP1114: Upper left point	DP1115: Lower right point	DP1116: Center point	DP1117: Radius	DP1118: Line button	DP1119: Rectangle button	DP1120: Circle button	DP1121: Event for push	DP1122: Event for release	DP1123: Start point	DP1124: End point	DP1125: Upper left point	DP1126: Lower right point	DP1127: Center point	DP1128: Radius	DP1129: Line button	DP1130: Rectangle button	DP1131: Circle button	DP1132: Event for push	DP1133: Event for release	DP1134: Start point	DP1135: End point	DP1136: Upper left point	DP1137: Lower right point	DP1138: Center point	DP1139: Radius	DP1140: Line button	DP1141: Rectangle button	DP1142: Circle button	DP1143: Event for push	DP1144: Event for release	DP1145: Start point	DP1146: End point	DP1147: Upper left point	DP1148: Lower right point	DP1149: Center point	DP1150: Radius	DP1151: Line button	DP1152: Rectangle button	DP1153: Circle button	DP1154: Event for push	DP1155: Event for release	DP1156: Start point	DP1157: End point	DP1158: Upper left point	DP1159: Lower right point	DP1160: Center point	DP1161: Radius	DP1162: Line button	DP1163: Rectangle button	DP1164: Circle button	DP1165: Event for push	DP1166: Event for release	DP1167: Start point	DP1168: End point	DP1169: Upper left point	DP1170: Lower right point	DP1171: Center point	DP1172: Radius	DP1173: Line button	DP1174: Rectangle button	DP1175: Circle button	DP1176: Event for push	DP1177: Event for release	DP1178: Start point	DP1179: End point	DP1180: Upper left point	DP1181: Lower right point	DP1182: Center point	DP1183: Radius	DP1184: Line button	DP1185: Rectangle button	DP1186: Circle button

FIGURE 26

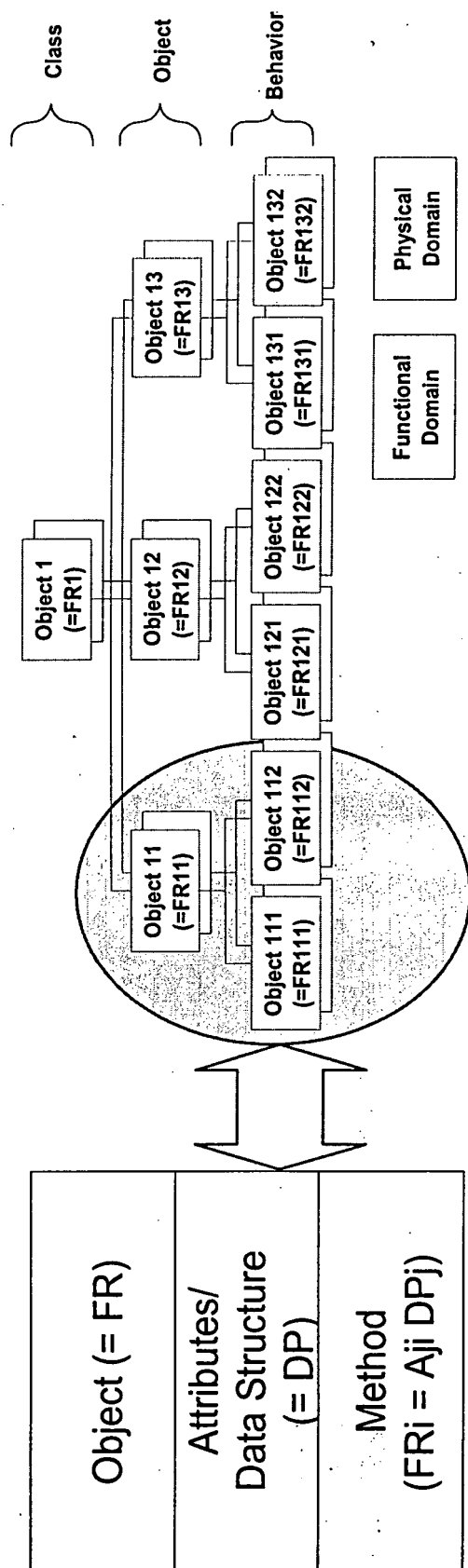


FIGURE 27

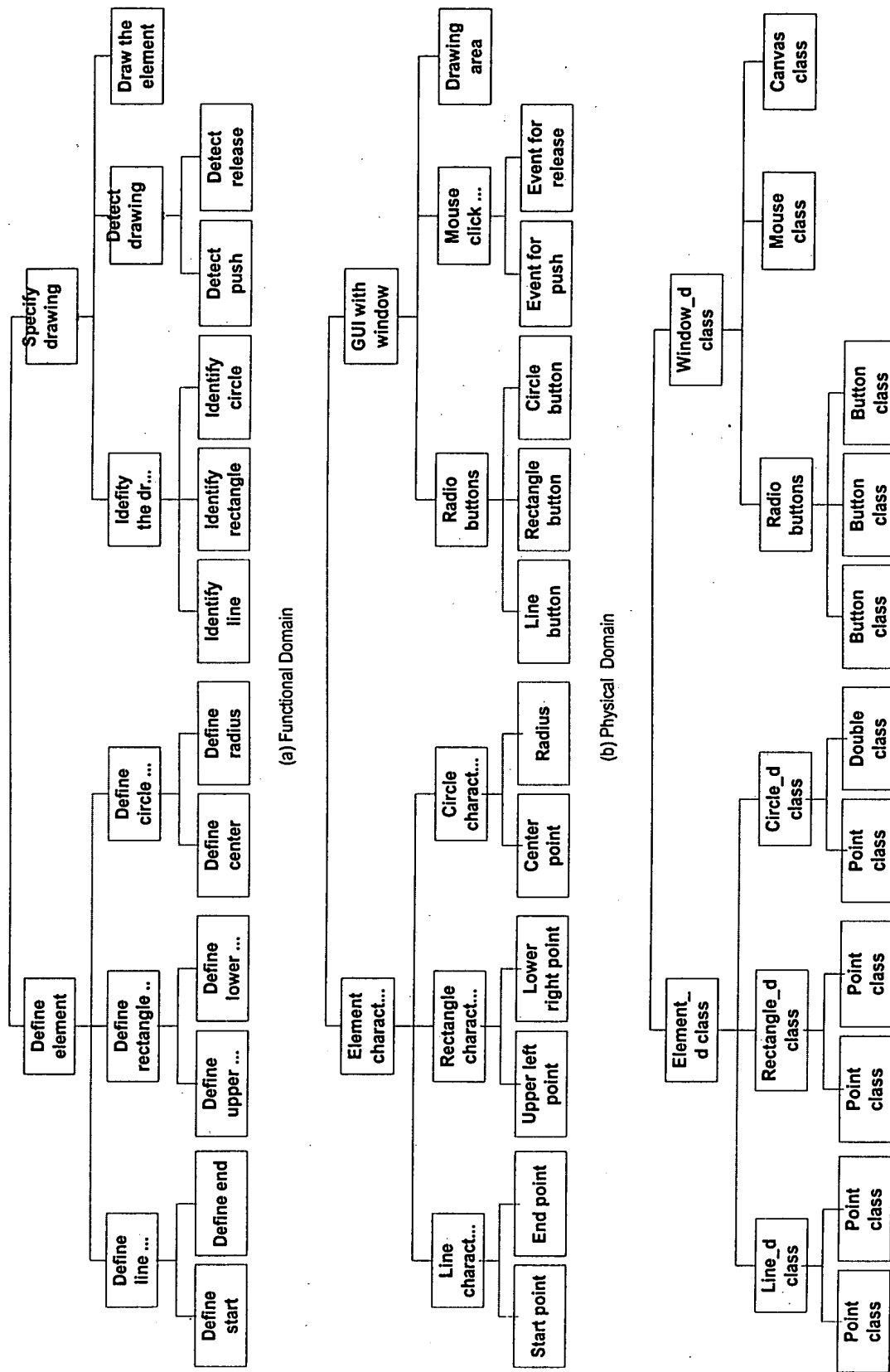


FIGURE 28

			DP1: Element characteristics						DP2: GUI with window					
			DP11: Line characteristics		DP12: Rectangle characteristic		DP13: Circle characteristic		DP21: Radio buttons			DP22: Mouse click information		
			DP111: Start point	DP112: End point	DP121: Upper left point	DP122: Lower right point	DP131: Center point	DP132: Radius	DP211: Line button	DP212: Rectangle button	DP213: Circle button	DP221: Event for push	DP222: Event for release	DP23: Drawing area
FR1: Define element	FR11: Define line element	FR111: Define start	I:setStart()		C:LineConstructor									
		FR112: Define end	J:setEnd()				D:RectangleConstructor							
	FR12: Define rectangle element	FR121: Define upper left corner			K:setULCorner()				A:ElementConstructor					
		FR122: Define lower right corner				L:setRLCorner()								
	FR13: Define circle element	FR131: Define center					M:setCenter()		E:CircleConstructor					
		FR132: Define radius						N:setRadius()						B: Window constructor
FR2: Specify drawing environment	FR21: Identify the drawing type	FR211: Identify line							O:addLine()			F:CreateButtons()		
		FR212: Identify rectangle								P:addRectangle()				
		FR213: Identify circle									Q:addCircle()		G:MouseListener	
	FR22: Detect drawing location	FR221: Detect mouse push	Message call		Message call		Message call			isLineSelected()	isRectangleSelected()	isCircleSelected()	R:mousePressed()	
		FR222: Detect mouse release	Message call		Message call		Message call			isLineSelected()	isRectangleSelected()	isCircleSelected()	S:mouseReleased()	
	FR23: Draw the element		getStart()	getEnd()	getULCorner()	getRLCorner()	getCenter()	getRadius()	isLineSelected()	isRectangleSelected()	isCircleSelected()			H:update()
				a: constructor				c: class						

FIGURE 29

Object	Object 11/11 2/12/1/1 22/131	Object 11	Object 12	Object 13	Object 1	Object 2	Object 211/212 /213	Object 22 Mouse	Object 23 Canvas	Object 1*
Name	Point	Double	Rectangle_d	Circle_d	Element_d	Window_d	Radio Bt			Element *
Attribute			DP121 Point upper_left DP122 Point lower_right	DP131 Point center DP132 Double radius	DP11 Line l DP12 Rectangle r DP13 Circle c	DP211 Radiobutton line DP212 Radiobutton rectangle DP213 Radiobutton circle DP22 Mouse m DP23 Canvas c				
Method										

FIGURE 30

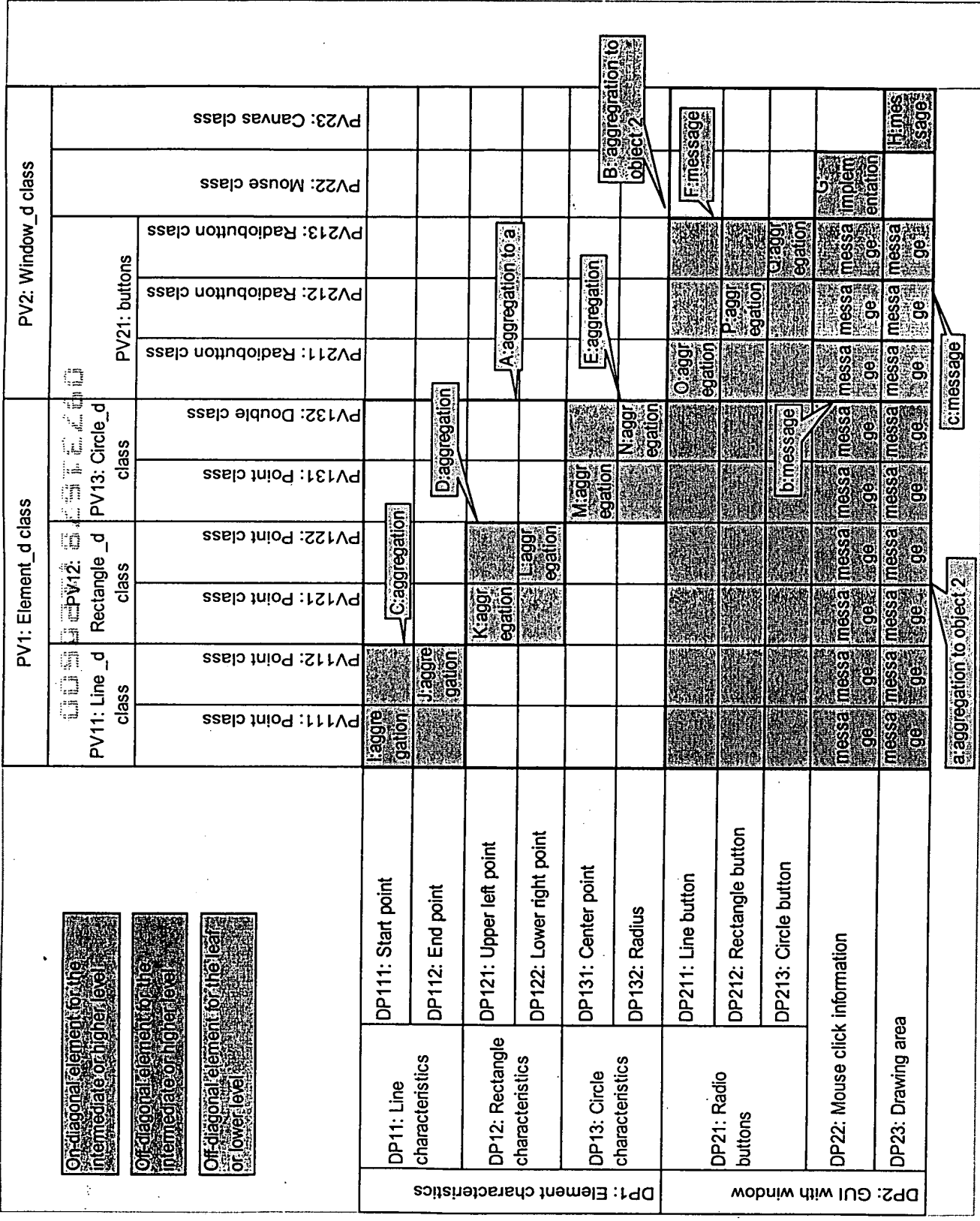


FIGURE 31

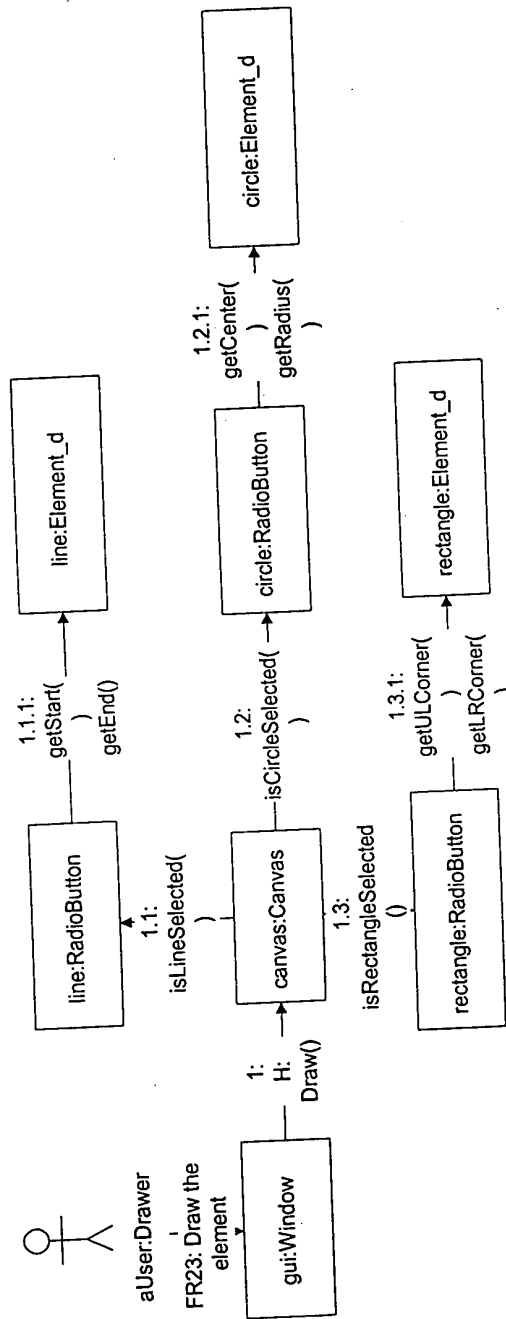


FIGURE 34

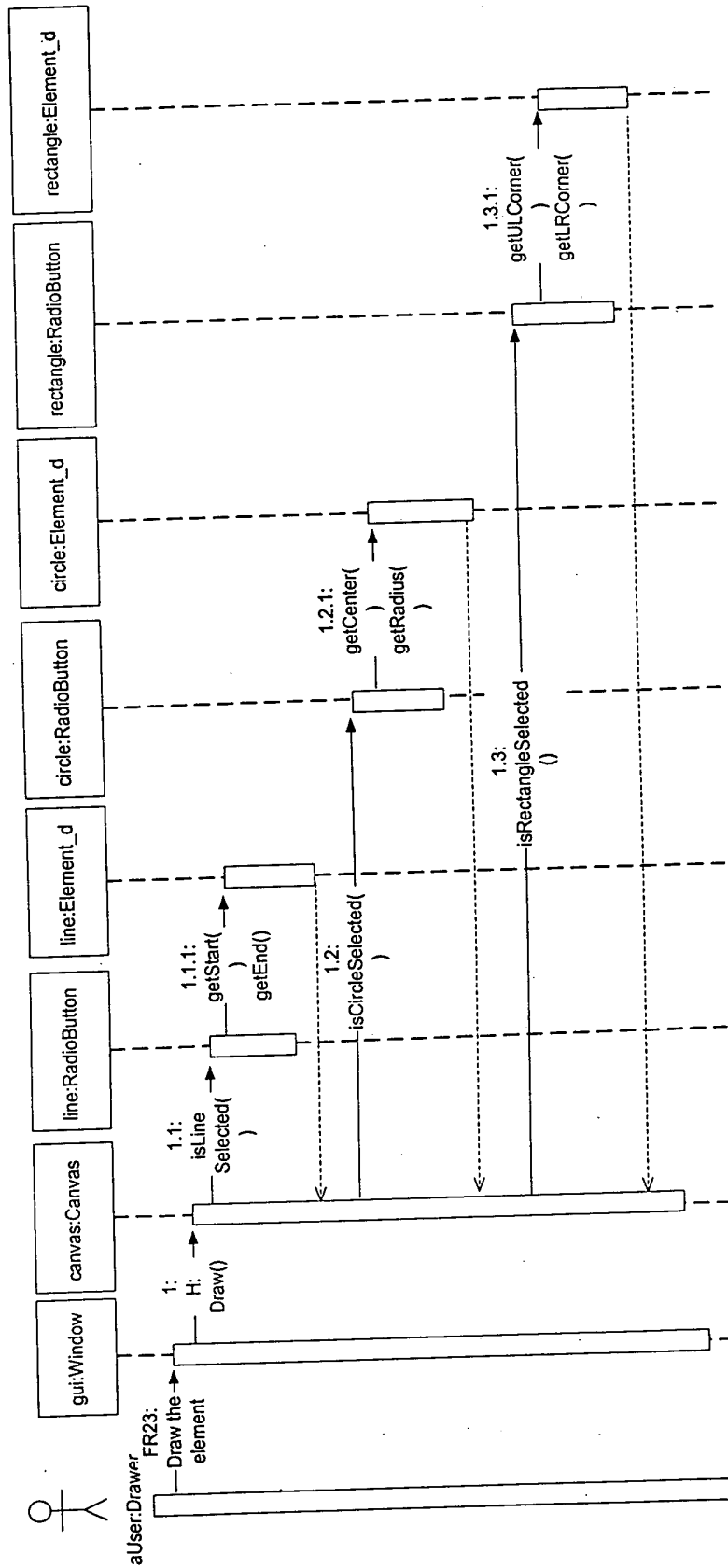


FIGURE 35

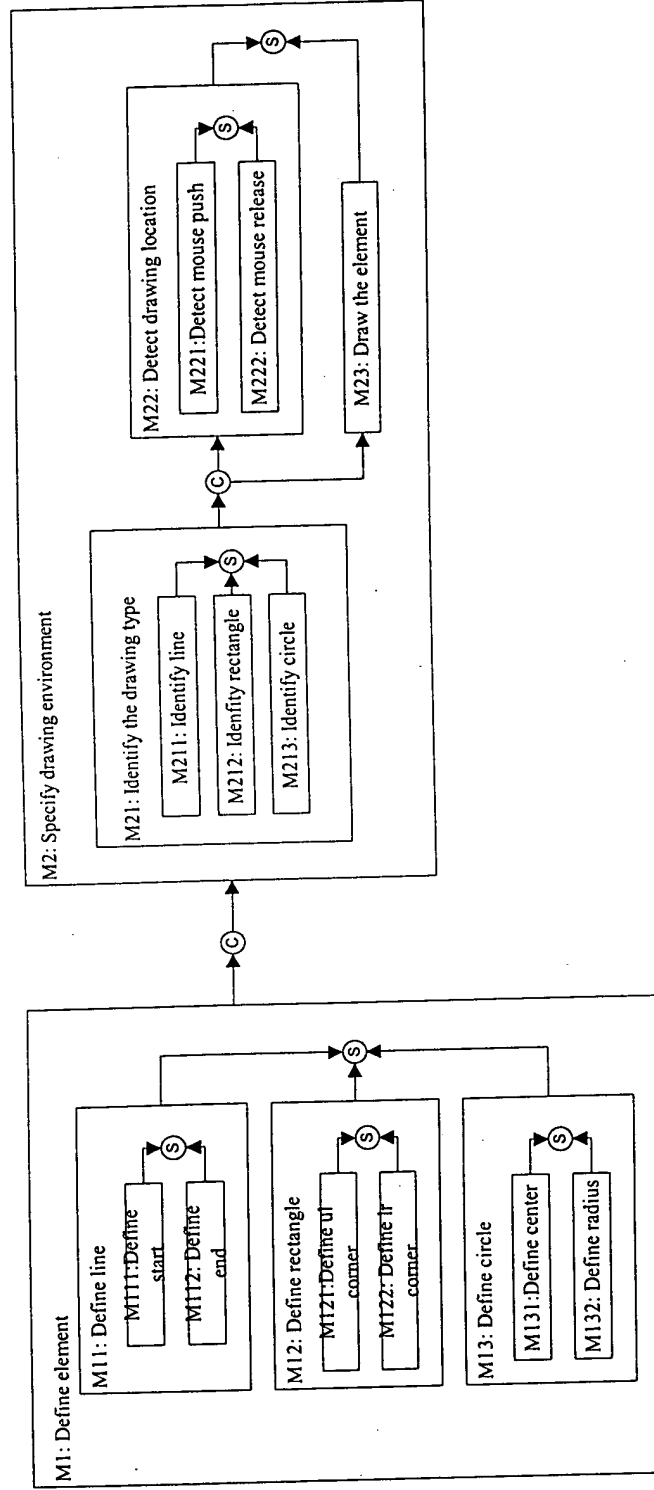


FIGURE 36

Object Oriented

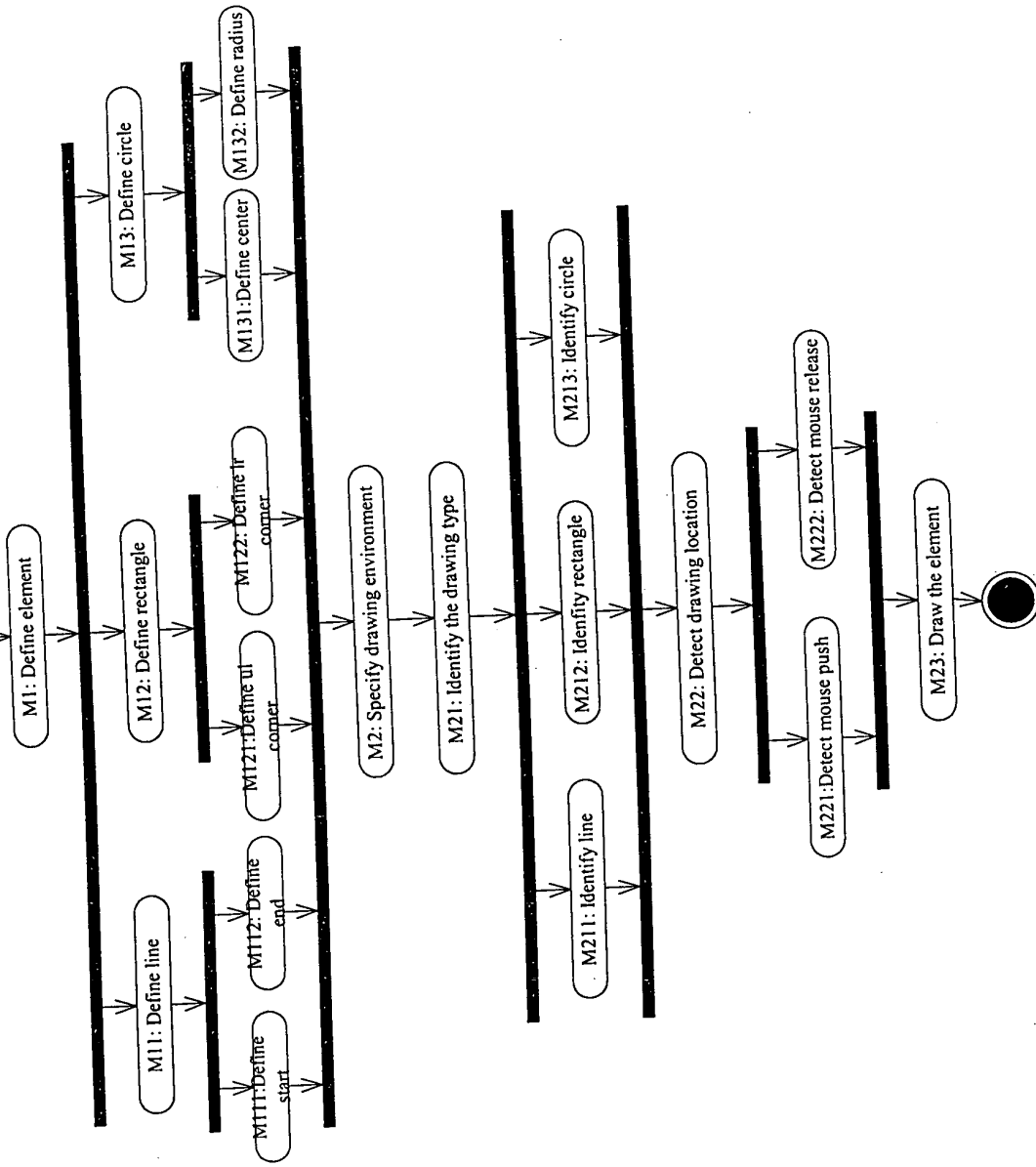


FIGURE 37


```

(object Petal
  version
    40)
(object Design "Logical View"
  is_unit
    TRUE
  is_loaded
    TRUE
  file_name
    "SDATA\\demo1.mdl"
  quid
    "3353F13A0386"
  defaults
    (object defaults
      rightMargin
        0.250000
      leftMargin
        0.250000
      topMargin
        0.250000
      bottomMargin
        0.500000
      pageOverlap
        0.250000
      clipIconLabels
        TRUE
      autoResize
        TRUE
      snapToGrid
        TRUE
      gridX
        16
      gridY
        16
      defaultFont
        (object Font
          size
            9
          face
            "helvetica"
          bold
            FALSE
          italics
            FALSE
          underline
            FALSE
          strike
            FALSE
          color
            0
          default_color
            TRUE)
      showMessageNum
        1
      showClassObject
        TRUE
      notation
        "Unified")
      (object Class_Category "Use Case View"
        "3353F13A0386"
        "Public"
        TRUE
        (list unit_reference_list
          (object Class "Student"
            quid
              "3353F162000A"
            documentation
              "Someone who is registered to take classes at the University."
            stereotype
              "Actor")
          .....
        )
      )
    )
  root_usecase_package
    quid
      exportControl
      global
      logical_models
        (object Class "Student"
          quid
            "3353F162000A"
          documentation
            "Someone who is registered to take classes at the University."
          stereotype
            "Actor")
        .....
    )
  )

```

FIGURE 39

Code	Parent	Number	Description	Keyword	Comment	Category	Verification	Leaf
Ex-a	0	1	Define element	-	-	-	-	FALSE
Ex-a	0	2	Specify drawing environment	-	-	-	-	FALSE
Ex-a	1	1	Define line element	-	-	-	-	FALSE
Ex-a	1	2	Define rectangle element	-	-	-	-	FALSE
Ex-a	1	3	Define circle element	-	-	-	-	FALSE
Ex-a	1.1	1	Define start	-	-	-	-	TRUE
Ex-a	1.1	2	Define end	-	-	-	-	TRUE
Ex-a	1.2	1	Define upper left corner	-	-	-	-	TRUE
Ex-a	1.2	2	Define lower right corner	-	-	-	-	TRUE
Ex-a	1.3	1	Define center	-	-	-	-	TRUE
Ex-a	1.3	2	Define radius	-	-	-	-	TRUE
Ex-a	2	1	Identify the drawing type	-	-	-	-	FALSE
Ex-a	2	2	Detect drawing location	-	-	-	-	FALSE
Ex-a	2	3	Draw the element	-	-	-	-	TRUE
Ex-a	2.1	1	Identify line	-	-	-	-	TRUE
Ex-a	2.1	2	Identify rectangle	-	-	-	-	TRUE
Ex-a	2.1	3	Identify circle	-	-	-	-	TRUE
Ex-a	2.2	1	Detect mouse push	-	-	-	-	TRUE
Ex-a	2.2	2	Detect mouse release	-	-	-	-	TRUE

FIGURE 40

Code	Parent	Number	Alternative	Description	Keyword	Comment	Category	Verification	Leaf	Name	Attribute	Type	Description
Ex-a	0	1	0	Element characteristics	-	-	-	-	FALSE	Line_d	start	Point	-
Ex-a	0	2	0	GUI with window	-	-	-	-	FALSE	Line_d	end	Point	-
Ex-a	1	1	0	Line characteristics	-	-	-	-	FALSE	Rectangle_d	upper_left	Point	-
Ex-a	1	2	0	Rectangle characteristics	-	-	-	-	FALSE	Rectangle_d	lower_right	Point	-
Ex-a	1	3	0	Circle characteristics	-	-	-	-	FALSE	Circle_d	center	Point	-
Ex-a	1.1	1	0	Start point	-	-	-	-	TRUE	Circle_d	radius	Radius	-
Ex-a	1.1	2	0	End point	-	-	-	-	TRUE	Element_d	line	Line_d	-
Ex-a	1.2	1	0	Upper left point	-	-	-	-	TRUE	Element_d	rectangle	Rectangle_d	-
Ex-a	1.2	2	0	Lower right point	-	-	-	-	TRUE	Element_d	circle	Circle_d	-
Ex-a	1.3	1	0	Center point	-	-	-	-	TRUE	Window_d	line	Radiobutton	-
Ex-a	1.3	2	0	Radius	-	-	-	-	FALSE	Window_d	rectangle	Radiobutton	-
Ex-a	2	1	0	Radio buttons	-	-	-	-	FALSE	Window_d	circle	Mouse	-
Ex-a	2	2	0	Mouse click information	-	-	-	-	TRUE	Window_d	mouse	Canvas	-
Ex-a	2	3	0	Drawn area	-	-	-	-	TRUE	Window_d	canvas	Canvas	-
Ex-a	2.1	1	0	Line button	-	-	-	-	TRUE	Window_d	mouse	Canvas	-
Ex-a	2.1	2	0	Rectangle button	-	-	-	-	TRUE	Window_d	mouse	Canvas	-
Ex-a	2.1	3	0	Circle button	-	-	-	-	TRUE	Window_d	mouse	Canvas	-
Ex-a	2.2	1	0	Event for push	-	-	-	-	TRUE	Window_d	mouse	Canvas	-
Ex-a	2.2	2	0	Event for release	-	-	-	-	TRUE	Window_d	mouse	Canvas	-

DP Table

ATTRIBUTE Table

VARIABLE Table

FIGURE 41

Code1	Code2	Value	Comment	Name	Method	Type	Description
Ex-a.0.1	Ex-a.0.1.0	A	-	Line_d	Line_d()	Line_d	-
Ex-a.0.2	Ex-a.0.1.0	a	-	Line_d	setStart()	void	-
Ex-a.0.2	Ex-a.0.2.0	B	-	Line_d	setEnd()	void	-
Ex-a.1.1	Ex-a.1.1.0	C	-	Rectangle_d	Rectangle_d()	Rectangle_d	-
Ex-a.1.2	Ex-a.1.2.0	D	-	Rectangle_d	setULCorner()	void	-
Ex-a.1.3	Ex-a.1.3.0	E	-	Rectangle_d	setLRCorner()	void	-
Ex-a.2.1	Ex-a.2.1.0	F	-	Circle_d	Circle_d()	Circle_d	-
Ex-a.2.2	Ex-a.2.1.0	b	-	Circle_d	setCenter()	void	-
Ex-a.2.2	Ex-a.2.2.0	G	-	Circle_d	setRadius()	void	-
Ex-a.2.3	Ex-a.2.1.0	c	-	Element_d	Element_d()	Element_d	-
Ex-a.2.3	Ex-a.2.3.0	H	-	Window_d	Window_d()	Window_d	-
Ex-a.1.1.1	Ex-a.1.1.1.0	I	-	Window_d	CreateButtons()	void	-
Ex-a.1.1.2	Ex-a.1.1.2.0	J	-	Window_d	addLine()	void	-
Ex-a.1.2.1	Ex-a.1.2.1.0	K	-	Window_d	addRectangle()	void	-
Ex-a.1.2.2	Ex-a.1.2.2.0	L	-	Window_d	addCircle()	void	-
Ex-a.1.3.1	Ex-a.1.3.1.0	M	-	Window_d	MouseListener()	void	-
Ex-a.1.3.2	Ex-a.1.3.2.0	N	-	Window_d	mousePressed()	Point	-
Ex-a.2.1.1	Ex-a.2.1.1.0	O	-	Window_d	mouseReleased()	Point	-
Ex-a.2.1.2	Ex-a.2.1.2.0	P	-	Window_d	draw()	void	-
Ex-a.2.1.3	Ex-a.2.1.3.0	Q	-	Window_d	isLineSelected()	boolean	-
Ex-a.2.2.1	Ex-a.2.2.1.0	R	-	Window_d	isRectanbleSelected()	boolean	-
Ex-a.2.2.2	Ex-a.2.2.2.0	S	-	Window_d	isCircleSelected()	boolean	-
Ex-a.2.3	Ex-a.1.1.0	x	-	Element_*	Element_*	Element_*	-
Ex-a.2.3	Ex-a.1.1.2.0	x	-	Element_*	getStart()	void	-
Ex-a.2.3	Ex-a.1.2.1.0	x	-	Element_*	getEnd()	void	-
Ex-a.2.3	Ex-a.1.2.2.0	x	-	Element_*	getULCorner()	void	-
Ex-a.2.3	Ex-a.1.3.1.0	x	-	Element_*	getLRCorner()	void	-
Ex-a.2.3	Ex-a.1.3.2.0	x	-	Element_*	getCenter()	void	-
Ex-a.2.2	Ex-a.1.1.0	x	-	Element_*	getRadius()	void	-
Ex-a.2.2	Ex-a.1.2.0	x	-	Element_*	assignLine()	void	-
Ex-a.2.2	Ex-a.1.3.0	x	-	Element_*	assignRectangle()	void	-
Ex-a.2.2	Ex-a.1.3.0	x	-	Element_*	assignCircle()	void	-
DM Table				METHOD Table			
				OPERATION Table			

FIGURE 42

000001 00000000

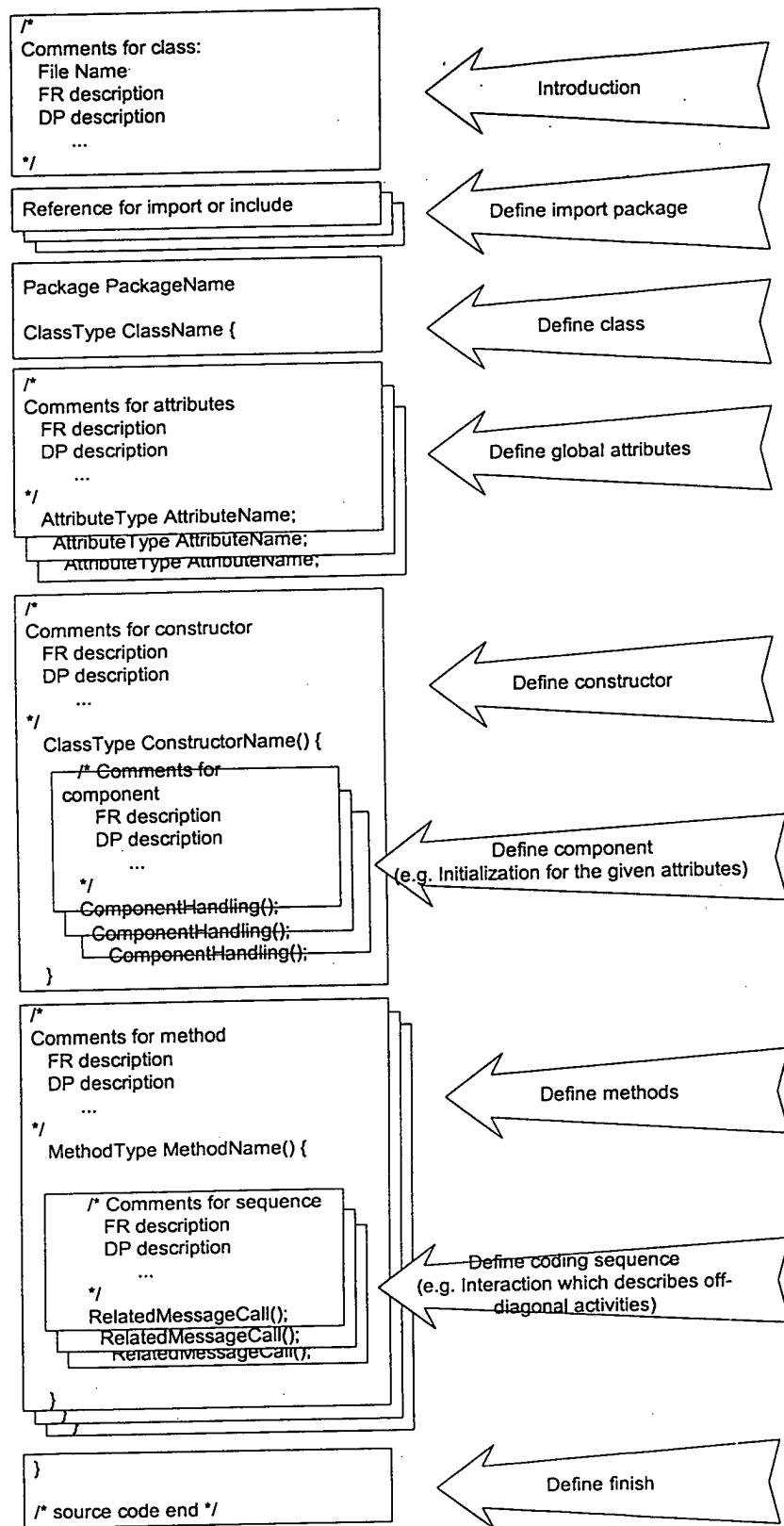


FIGURE 43

```

/*
Comments for class:
File Name
FR description
DP description
...
*/

```

```

Reference for import or include

```

```

Package PackageName

```

```

ClassType ClassName {

```

```

/*
Comments for attributes
FR description
DP description
...
*/
AttributeType AttributeName;
AttributeType AttributeName;
AttributeType AttributeName;

```

```

/*
Comments for constructor
FR description
DP description
...
*/
ClassType ConstructorName() {
/* Comments for
component
FR description
DP description
...
*/
ComponentHandling();
ComponentHandling();
ComponentHandling();
}

```

```

/*
Comments for method
FR description
DP description
...
*/
MethodType MethodName() {
/* Comments for sequence
FR description
DP description
...
*/
RelatedMessageCall();
RelatedMessageCall();
RelatedMessageCall();
}

```

```

}
/* source code end */

```

```

/*
Comments for class:
File Name: Window_d.java
FR2: Specify drawing environment
DP2: GUI with window
FR2 = a*DP1(Element characteristic) + B*DP2(GUI with window)
*/

```

```

import javax.swing.*;
import java.awt.*;

```

```

public class Window_d { /* DP2 */

```

```

/* Comments for attributes:
FR211: Identify line
DP211: Line button */
RadioButton line; /* DP211 */

```

```

/* Comments for attributes:
FR212: Identify rectangle
DP212: Rectangle button */
RadioButton rectangle; /* DP212 */
...

```

```

/*
Comments for constructor:
FR2: Specify drawing environment
DP2: GUI with window
*/
public Window_d() { /* Element of design matrix: B */

/* Comments for component
FR21: Identify the drawing type
DP21: Radio button */
CreateButtons(); /* Element of design matrix: F */

/* Comments for component
FR22: Detect drawing location
DP22: Mouse click information */
MouseListener(); /* Element of design matrix: G */

...
}

```

```

/* Comments for method:
FR211: Identify line
DP211: Line button */
public void addLine() { /* Element of design matrix: O */
}

...

/* Comments for method:
FR221: Detect mouse push
DP221: Event for push */
public void mousePushed() { /* Element of design matrix: R */

/* Comment for sequences
DP213: Circle button */
isCircleSelected();

...

/* Comment for sequences
DP111: Start point */
Element_.assignLocation();

}

...

```

Interaction 221

```

}
/* End: Window_d.java */

```

FIGURE 44

Parent Information	
Number	Description
FR 1.1	Manage design workflow
DP 1.1	Management roadmap
FR Information	
Number	Description
FR # 1	Provide security
FR # 2	Assign tasks
FR # 3	Manage schedule
FR # 4	Construct design h...
FR # 5	Facilitate changes ...
DP Information	
Number	Description
DP # 1	Login privilege
DP # 2	Resource of de...
DP # 3	Schedule-mana...
DP # 4	Data structure f...
DP # 5	ECO handling t...

FIGURE 47A

Parent	FR	DP
	Parent FR description	Parent DP description
1	FR 1 description	DP 1 description
2	FR 2 description	Alternative DP 2(a) Alternative DP 2(b) Alternative DP 2(c)
3	FR 3 description	DP 3 description

FIGURE 47B

005001 02976200

Parent Information	
Number	Description
FR 1.1	Manage design workflow
DP 1.1	Management roadmap
FR Information	
Number	Description
FR #1	Provide security
FR #2	Assign tasks
FR #3	Manage schedule
FR #4	Construct design h...
FR #5	Facilitate changes ...
DP Information	
Number	Description
DP #1	Login privilege
DP #2	Resource of de...
DP #3	Schedule-mana...
DP #4	Data structure f...
DP #5	ECO handling L...

FIGURE 48A

#. 1.2.3	FR	DP
Parent	Parent FR description	Parent DP description
#.1	FR 1 description	DP 1 description
#.2	FR 2 description	Alternative DP 2(a)
		Alternative DP 2(b)
		Alternative DP 2(c)
#.3	FR 3 description	DP 3 description

FIGURE 48A B

009027 0291000

Mapping		Constraints		Robust Design		Analysis	
Index	Category	Type	Information	Comments	Operator	Target	Calculated
1	Critical	Mark	Weight	if	Less than (<=)	300 lb	
2	Interface	Field	Cost	if	More than (>=)	\$500	
3	Project	Manu	Volume	if	Exact (= +/-)	10cu	

	C# 1	C# 2	C# 3	CA's
FR# 1	X			if
FR# 2	X	X		
FR# 3	X		X	
FR# 4	X			if

FIGURE 49B

Constraint Information:						
Num...	Descr...	FR #1	FR #2	FR #3	FR #4	FR #5
C # 1	Make...	X	X	X	X	X
C # 2	Supp...	X	X	X	X	X
C # 3	Elimi...	X	X	X	X	X
C # 4	Facilit...	X	X	X	X	X
C # 5	Funct...			X	X	
C # 6	Obie...			X	X	

FIGURE 49A

FR#	CH#1	CH#2	CH#3	CA's
FR#1	X			<input checked="" type="checkbox"/>
FR#2	X	X	X	<input type="checkbox"/>
FR#3	X		X	<input type="checkbox"/>
FR#4	X			<input checked="" type="checkbox"/>

Customer Needs (CNS)

- CH1.1: Documentation
- CH1.2: Printing (Generate hardcopy readily)
- CH1.3: FRDP/PPV and Design Matrix
- CH1.4: Comments
- CH1.5: Constraints
- CH1.6: Support customer attributes to define top level FRs
- CH1.7: Maintain alternative design
- CH2.1: Ease of use for the software
- CH2.2: User-defined option
- CH2.3: Support the graphical representation of DP (Manage Images and display)
- CH2.4: Graphics handling (Figures, Equations,)
- CH2.5: Support powerful editing function (copy, cut & paste, move, delete, drag)
- CH2.6: Customized the design environment
- CH2.7: Efficient graphical representation (Navigation)
- CH2.8: Confirm dialog box

FIGURE 50

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

Index #	Information				Target Value		
	Category	Type	Constraints	Comments	Operator	Target	Calculated
1	Critical	Market	Weight	<input checked="" type="checkbox"/>	Less than (<=)	300 lb	
2	Interface	Field	Cost	<input type="checkbox"/>	More than (>=)	\$500	
3	Project	Manu	Volume	<input checked="" type="checkbox"/>	Exact (= +/-)	10cu	

FIGURE 51

[illegible]

FIGURE 52B

Parent Information		
Num.	Description	Comment
FR #1	Make a decision-making tool whi...	A software tool for decision maki...
DP #1	Computerized system with the A...	Software for Axiomatic Design.

FR Information		
Num.	Description	Comment
FR #1	Manage a des...	The design a...
FR #2	Provide decis...	The FR desl...
FR #3	Support use...	The Grlt is o...
FR #4	Provide effici...	All kinds of d...
FR #5	Provide utility...	The fundam...

DP Information		
Num.	Description	Comm.
DP #1	Management to...	
DP #2	Decision-maki...	
DP #3	Graphical User...	
DP #4	Data-managing...	
DP #5	Plug-in software	

Index #	Information				Comment		App. Link
	Template	FR	DP		FR	DP	
Parent		Control the FR/DP domain	FR/DP window		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1		Control the mapping	Mapping tab		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
			Domain tab		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2		Assign constraints	Constraints tab		<input type="checkbox"/>	<input type="checkbox"/>	
3		Refine the design	Robust design tab		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4		Analyze the design	Analysis tab		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

			DP1					DP2				
			DP11	DP12	DP13	DP21	DP22	DP23				
FR1	FR11	FR111	X									
	FR11	FR112	X									
	FR12	FR121		X								
	FR12	FR122		X								
	FR13	FR131			X							
	FR13	FR132			X							
FR2	FR21	FR211				X						
	FR21	FR212				X						
	FR21	FR213				X						
	FR22	FR221	X			X						
	FR22	FR222	X			X						
	FR23		X			X						

FIGURE 53



FIGURE 55A



FIGURE 55B

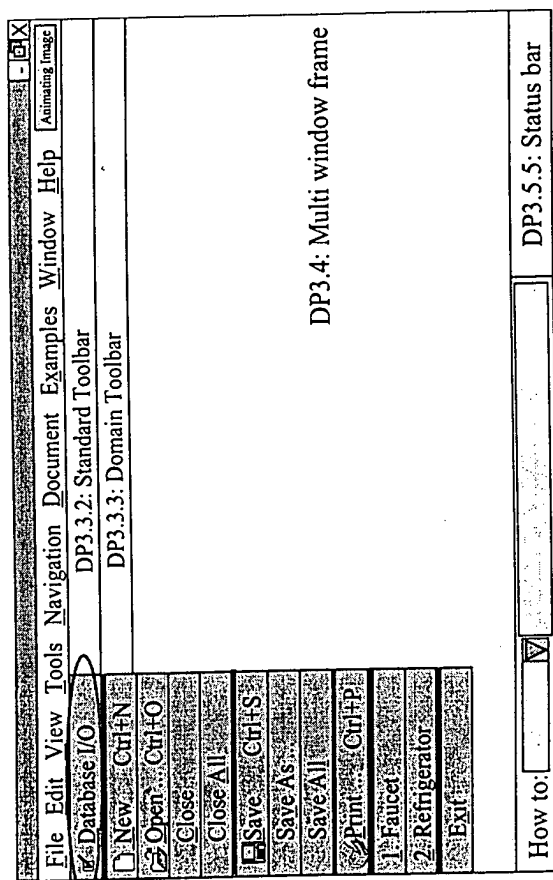


FIGURE 57








Resources for control											
Roadmap	Is this step finished?		Menu	Tab	Toolbar	Buttons					
	Yes	No				In Mapping tap	In Constraint tab	In Analysis tab	In Robust Design		
Start the design process			View -> Project Control	Constraints, Robust design, Analysis	Project Control						
						Constraints		One step design matrix control buttons			
								Decompose			
						Analysis		Decompose		Flow Chart, Impact List, Check consistency	
Activities at one level of the design hierarchy											
Activities over the design hierarchy			View -> Project Control	Robust design	Project Control				Check Constraints, Audit		
										Check Constraints, Audit	

FIGURE 60

Mapping		Constraints		Robust Design		Analysis		Design Questions	
Index #	Template	FR	Information	DP	FRDP window	FR	Comment	App Link	
1	Parent	Control the FR/DP domain	Mapping tab						
2		Control the mapping	Domain tab						
3		Assign constraints	Constraints tab						
4		Refine the design	Robust design tab						
		Analyze the design	Analysis tab						

	DP# 1	DP# 2(a)	DP# 2(b)	DP# 3	DP# 4
FR# 1	X				
FR# 2	X	X			
FR# 3	X		X		
FR# 4	X			X	

Additional blank row

DP3.5.3: To do List

DP3.5.4: Legend Display

DP3.5.7: Aerial View

Measure of Coupling: Information Contents:

DP3.5.6: Scrolling Theorem/Corollary

FIGURE 61

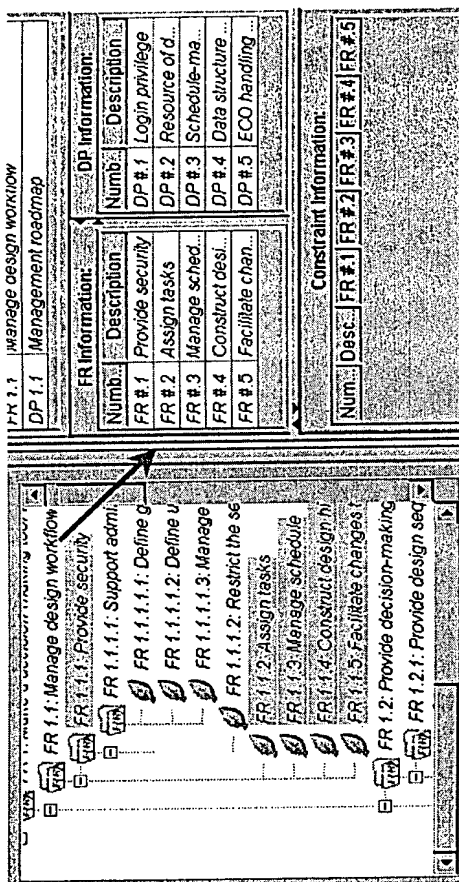


FIGURE 63A

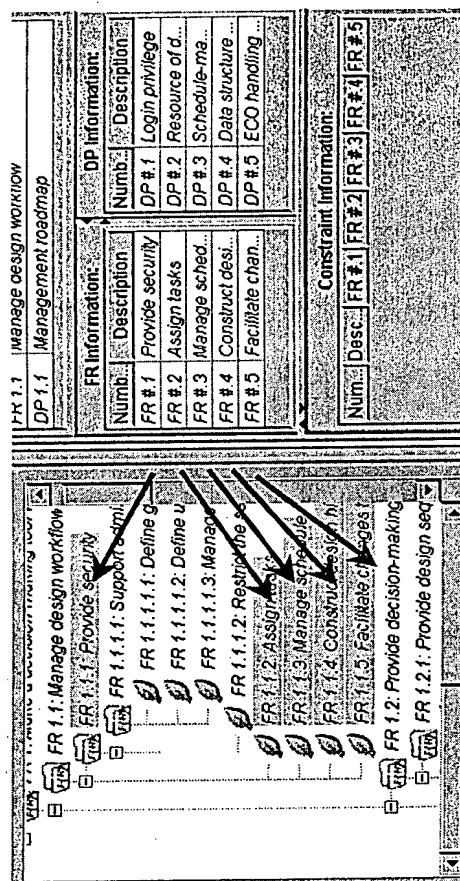






FIGURE 63B

Navigation Document	
	Goto Parent
	Goto Child
	Goto previous Sibling
	Goto next Sibling

ument Example:




FIGURE 64

Control Item		Level 1	Level 2	Level 3	Level 4	Level 5
		Beginner		Intermediate		Expert
Available Features	FR/DP Mapping	●	●	●	●	●
	Design Matrix	●	●	●	●	●
	Alternativ DP		●	●	●	●
	Analysis-Flow Chart		●	●	●	●
	Constraints			●	●	●
	Comments			●	●	●
	CN			●	●	●
	CN/FR Mapping			●	●	●
	Analysis-Child List			●	●	●
	Analysis-Impact List			●	●	●
	DP/PV Mapping				●	●
	Analysis-Check Consistency				●	●
	Analysis-Check Constraints				●	●
	Templates				●	●
	Verification				●	●
	Application Link				●	●
	Analysis-Audit					●
	Nested(Full) Matrix Handling					●
	Robust Design					●
	Project Control					●
Automatic Menu Control (Enables the marked item)	File Menu				●	●
	View Menu					
	Database I/O			●	●	●
	CN Domain			●	●	●
	FR/DP Domain	●	●	●	●	●
	DP/PV Domain				●	●
	Nested (Full) Matrix					●
	Project Control					●
	Preference Menu					
	Display Configuration Manag	●	●	●	●	●
	Numbering		●	●	●	●
	Design Matrix		●	●	●	●
	Display Color		●	●	●	●
	Design Matrix Color	●	●	●	●	●
	GUI Display			●	●	●
	File Location				●	●
	Resource				●	●
	Database I/O				●	●
	Templates				●	●
	Constraints				●	●
	Verifications				●	●
Automatic Window Control (Displays the marked item)	Document Menu					
	PV Tree Diagram				●	●
	Nested(Full) Matrix					●
	FR/DP Window					
	No Tab	●				
	Mapping Tab		●	●	●	●
	Constraints Tab			●	●	●
	Robust Design Tab					●
	Analysis Tab					
	Flow Chart Tab		●	●	●	●
	Child List Tab			●	●	●
	Impact List Tab			●	●	●
	Check Consistency Tab				●	●
	Check Constraints Tab				●	●
	Audit Tab					●
	CN Window			●	●	●
	DP/PV Window				●	●
	Project Control Window					●
	Nested (Full) Design Matrix Window					●

FIGURE 65

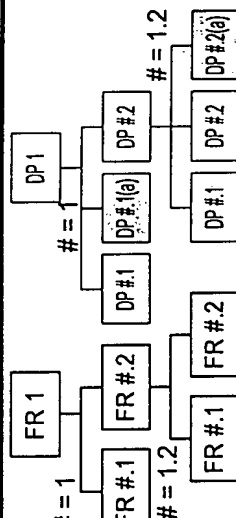
		Default Numbering	Alternative Numbering	Example
Numbering Type	Numeric	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1, 2, 3
	Lower case	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a, b, c
	Upper case	<input type="checkbox"/>	<input type="checkbox"/>	A, B, C
Indicator	Alternative connector	()		Defined by user
	Parent index	#		
	Divider	.		
Example				

FIGURE 66

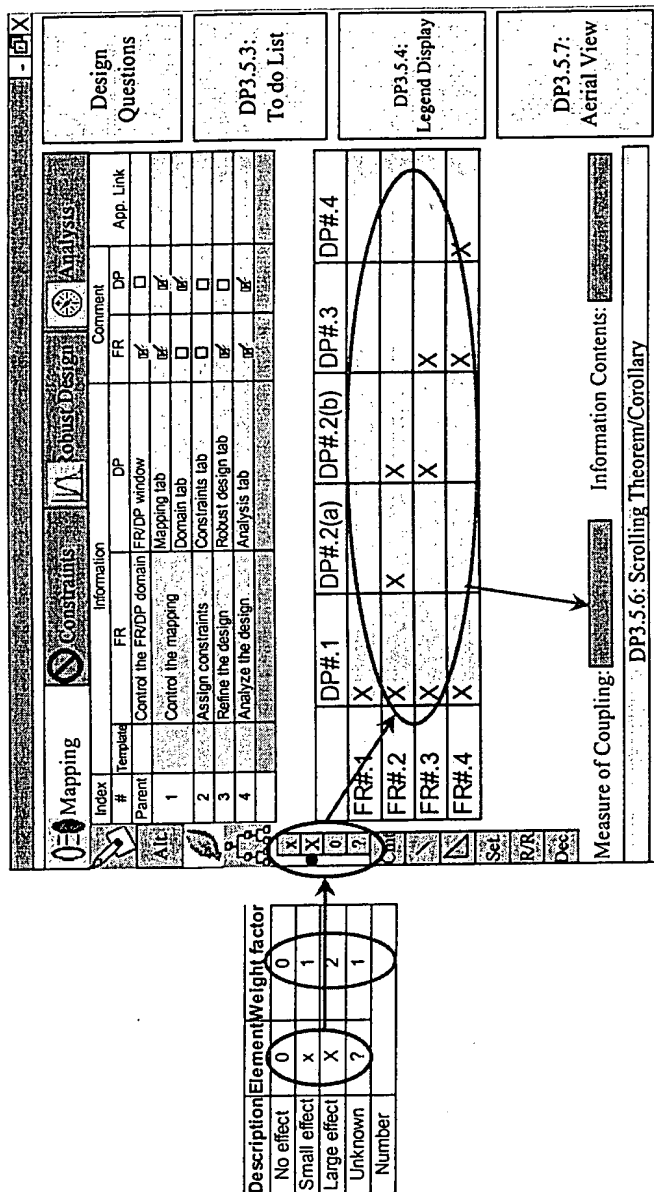


FIGURE 67

		Legend category		
		Color	Font	Line
Display	Activated cell			N/A
	Normal			
	Default			N/A
	Focus			N/A
	Alternative			N/A
	Redundant			N/A
	Constraints			N/A
	Comments			N/A
Design Matrix	Uncoupled		N/A	
	Decoupled		N/A	
	Coupled		N/A	
	Undefined		N/A	
Template	Process			---
	Transport			---
	...			

FIGURE 68

005027 02976260

Help	
FR-530P-53	Academic User
dshee	Wed 1/26/2000

FIGURE 69

Mapping		Constraints		Robust Design		Analysis	
Index	Information	Information	Information	Information	Information	Information	Information
<p>What is the functions that the system / product should perform?</p> <p>How do you achieve these functions?</p> <p>Do you think this set of FRs is minimum set to fulfill the parent level requirements?</p> <p>Does changing this DP affect the FR?</p> <p>Does the choice of this DP affect that FR?</p> <p>Can the DP be designed without affecting the FR?</p> <p>...</p>							
FR# 2	X	X	X	X	X	X	X
FR# 3	X	X	X	X	X	X	X
FR# 4	X	X	X	X	X	X	X

Design Questions	DP3.5.3: To do List	DP3.5.4: Legend Display	DP3.5.7: Aerial View
------------------	---------------------	-------------------------	----------------------

Measure of Coupling:	Information Content:
DP3.5.6: Scrolling Theorem/Corollary	

FIGURE 70

Rank/Rearrange the Design Matrix combination...

Matrix Information:

	DP: #1	DP: #2(1)
FR: #1	X	O
FR: #2	O	X

Ranking Information:

FR: #1	FR: #2	Status	Off X's	Coupled X's
DP: #1	DP: #2(1)	UnCoupled	0/4	N/A
DP: #1	DP: #2	UnCoupled	0/4	N/A
DP: #1(1)	DP: #2(1)	DeCoupled	1/4	N/A
DP: #1(1)	DP: #2	DeCoupled	1/4	N/A
DP: #1	DP: #2(2)	DeCoupled	1/4	N/A
DP: #1(1)	DP: #2(2)	Coupled	2/4	1

Design Matrix Table:

	DP: #1	DP: #2(1)	DP: #2(2)
FR: #1	X	O	O
FR: #2	O	X	X

Rearrange Sequence:

☐ No Rearrange

☐ FR: 1 - FR: 2 -

☐ FR: 2 - FR: 1 -

DP Ranking Assumptions:

☐ Strict Ranking

☐ Free association of DPs

☐ Get Rank Combination

Display Options:

☐ Color

☐ Description

☐ Keyword

Colors:

☐ Unknown Design

☐ UnCoupled Design

☐ DeCoupled Design

☐ Coupled Design

☐ Alternative DP

☐ Redundant DP

☐ Has Comment

Change **Cancel** **Help**

FIGURE 72

Child List	Impact List	Inconsistency	Decoupling
Number	FR Description	DR Description	
1.1	Manage design workflow	Management roadmap	
1.1.1	Provide security	Login privilege	
1.1.2	Assign tasks	Resource of design activity	
1.1.3	Manage schedule	Schedule-managing tool (e.g. MS Project)	
1.1.4	Construct design hierarchy	Data structure for Axiomatic Design concept	
1.1.5	Facilitate changes to the design	ECO handling tool	
1.1.1.1	Support administrative tool	User manager	
1.1.1.2	Restrict the security access level	Authority code	
1.1.1.1.1	Define group	Group specification	
1.1.1.1.2	Define user	User specification	
1.1.1.1.3	Manage authority code	Authority code specification	

FIGURE 73

Design Matrix Table					
	DP #1	DP #2	DP #3	DP #4	DP #5
FR #1	X	O	O	O	O
FR #2	X	X	O	O	O
FR #3	X	X	X	X	X
FR #4	X	X	O	X	O
FR #5	O	O	O	X	X

Child List		Impact List		Design Matrix	
Number	FR Description	DP Description	DP Description	DP Description	DP Description
1.4.1	Support data file	File handling	File handling	File handling	File handling
1.4.2	Support database	Database handling	Database handling	Database handling	Database handling
1.4.2.1	Provide consistency during data read a...	Data file format	Data file format	Data file format	Data file format
1.4.2.2	Control error during read/write	Exception handling	Exception handling	Exception handling	Exception handling
1.4.2.3	Convert data from old version	Data file converter	Data file converter	Data file converter	Data file converter
1.4.2.4	Read Data	Method for read	Method for read	Method for read	Method for read
1.4.2.5	Write data	Method for write	Method for write	Method for write	Method for write
1.4.2.6	Provide utility to deal with the program...	Method for utility	Method for utility	Method for utility	Method for utility
1.5	Provide utility function	Plug-in software	Plug-in software	Plug-in software	Plug-in software
1.5.1	Handle external applications	Standard interface for external appli...	Standard interface for external appli...	Standard interface for external appli...	Standard interface for external appli...
1.5.2	Teach the axiomatic design concept	Education software	Education software	Education software	Education software
1.5.3	Simulate the system architecture	Simulation Software	Simulation Software	Simulation Software	Simulation Software
1.5.4	Draw the Design Parameter figure	CAD Software	CAD Software	CAD Software	CAD Software
1.5.5	Analyze the system performance	Analysis software (i.e. ANSYS, NAS...	Analysis software (i.e. ANSYS, NAS...	Analysis software (i.e. ANSYS, NAS...	Analysis software (i.e. ANSYS, NAS...
1.6	Support user friendliness of the software	Graphical User Interface software	Graphical User Interface software	Graphical User Interface software	Graphical User Interface software

Display Options	Colors	Has Effect	Has Comment
<input type="radio"/> Description	<input type="radio"/> UnCoupled Design	<input type="radio"/> No Effect	<input type="radio"/> Has Comment
<input type="radio"/> Keyword	<input type="radio"/> DeCoupled Design	<input type="radio"/> Has Effect	<input type="radio"/> Has Comment
<input type="radio"/> Coupled Design	<input type="radio"/> Coupled Design	<input type="radio"/> Has Effect	<input type="radio"/> Has Comment

FIGURE 74

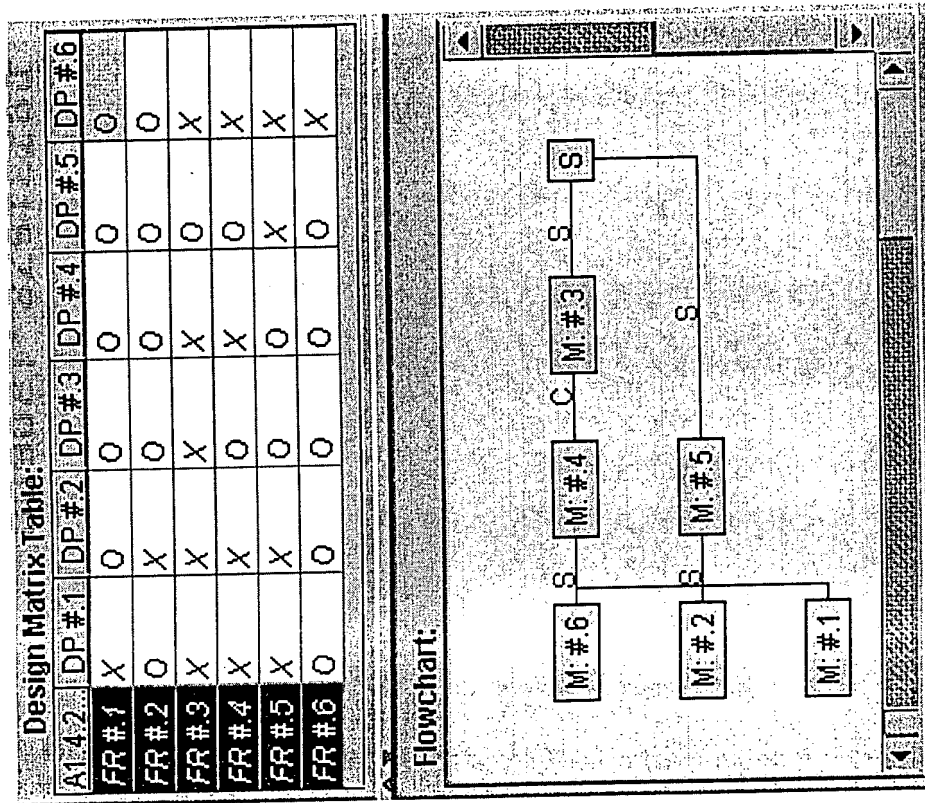
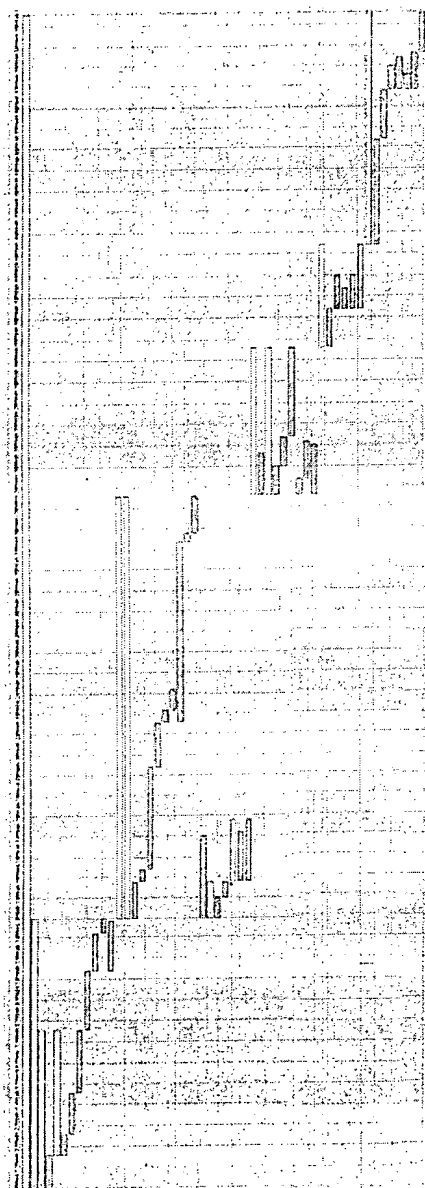


FIGURE 75



THE UNIVERSITY OF CHICAGO

三、四、五、六、七、八、九、十、十一、十二、十三、十四、十五、十六、十七、十八、十九、二十、二十一、二十二、二十三、二十四、二十五、二十六、二十七、二十八、二十九、三十、三十一、三十二、三十三、三十四、三十五、三十六、三十七、三十八、三十九、四十、四十一、四十二、四十三、四十四、四十五、四十六、四十七、四十八、四十九、五十、五十一、五十二、五十三、五十四、五十五、五十六、五十七、五十八、五十九、六十、六十一、六十二、六十三、六十四、六十五、六十六、六十七、六十八、六十九、七十、七十一、七十二、七十三、七十四、七十五、七十六、七十七、七十八、七十九、八十、八十一、八十二、八十三、八十四、八十五、八十六、八十七、八十八、八十九、九十、九十一、九十二、九十三、九十四、九十五、九十六、九十七、九十八、九十九、一百。

SAVER
QUITY

100

100

Page Information: Page: 1

Document Form: 1

☒ Customer N

☒ PROPPV

☐ HEDPVC

☒ Constraints

☒ Design M

☐ Design M

☐ Default Disp

☐ Full Display

☐ S E T

FIGURE 78

DESIGN SET 80					
Mapping	Constraints	Robust Design	Analysis		Design Questions
DP#	DP#	DP#	DP#	DP#	
FR#1	X				
FR#2	X	X			
FR#3	X		X		
FR#4	X		X	X	
<div> <div>Check my design:</div> <ul style="list-style-type: none"> - Is the design completely uncoupled/decoupled? - Does it satisfy Constraints? - Does each leaf DP have a drawing? - Are there any unchecked CN's? - Has everybody done consistency check? - Does the default design have the least information? - Are all the leaf nodes checked as leaf? </div>					
Flow Chart					
Child List					
Impact List					
Check Consistency					
Check Constraints					
Audit					
DP3.5.6: Scrolling Theorem/Corollary					

FIGURE 80

000001 0291E.59

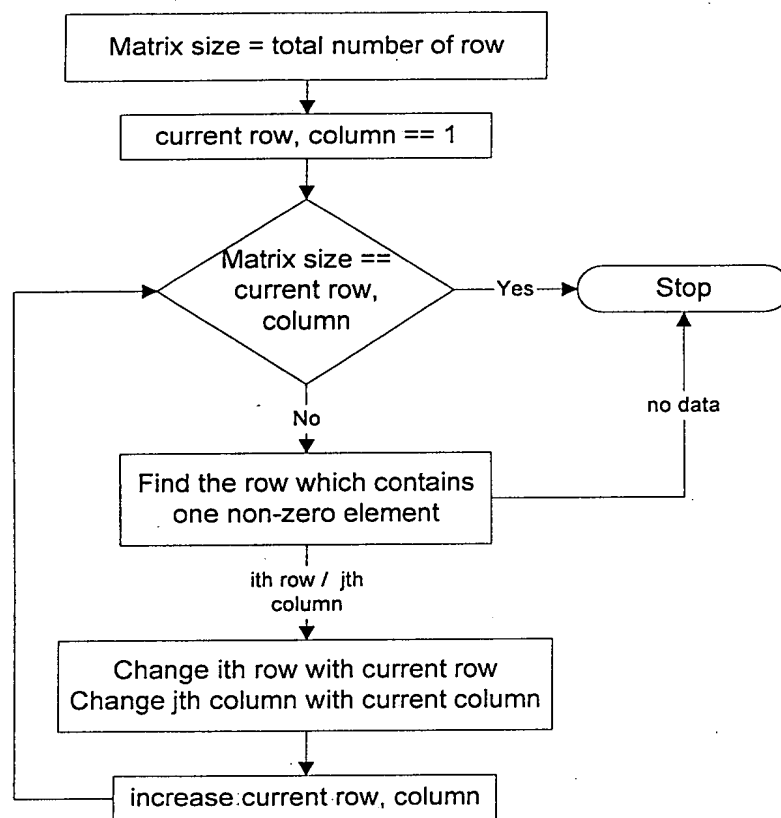


FIGURE 81

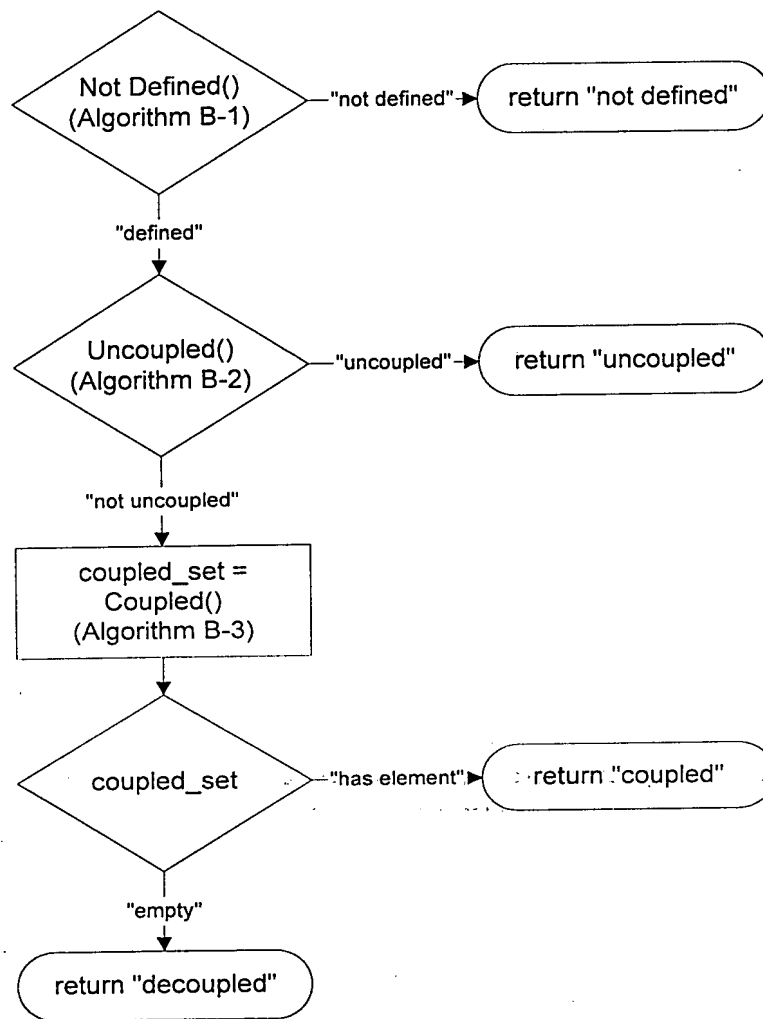


FIGURE 82

```

Loop One (int row=0; row<total_row_number; row++) {
  Loop Two (int column=0; column <total_column_number; column++) {
    If(maxtrix[row][column] == "empty")
      return "not defined"

    If(row == column) {
      If(matrix[row][column] == "O")
        return "not defined"
    }
  }
}

return "defined"

```

If one of the diagonal element has "O", the design is not defined in terms of the axiomatic design viewpoint

FIGURE 83

```

Loop One (int row=0; row<total_row_number: row++) {
    Loop Two (int column=0; column <total_column_number; column++) {
        If(row != column) {
            If(matrix[row][column] == "X")
                return "not uncoupled"
        }
    }
}

return "uncoupled"

```

FIGURE 84

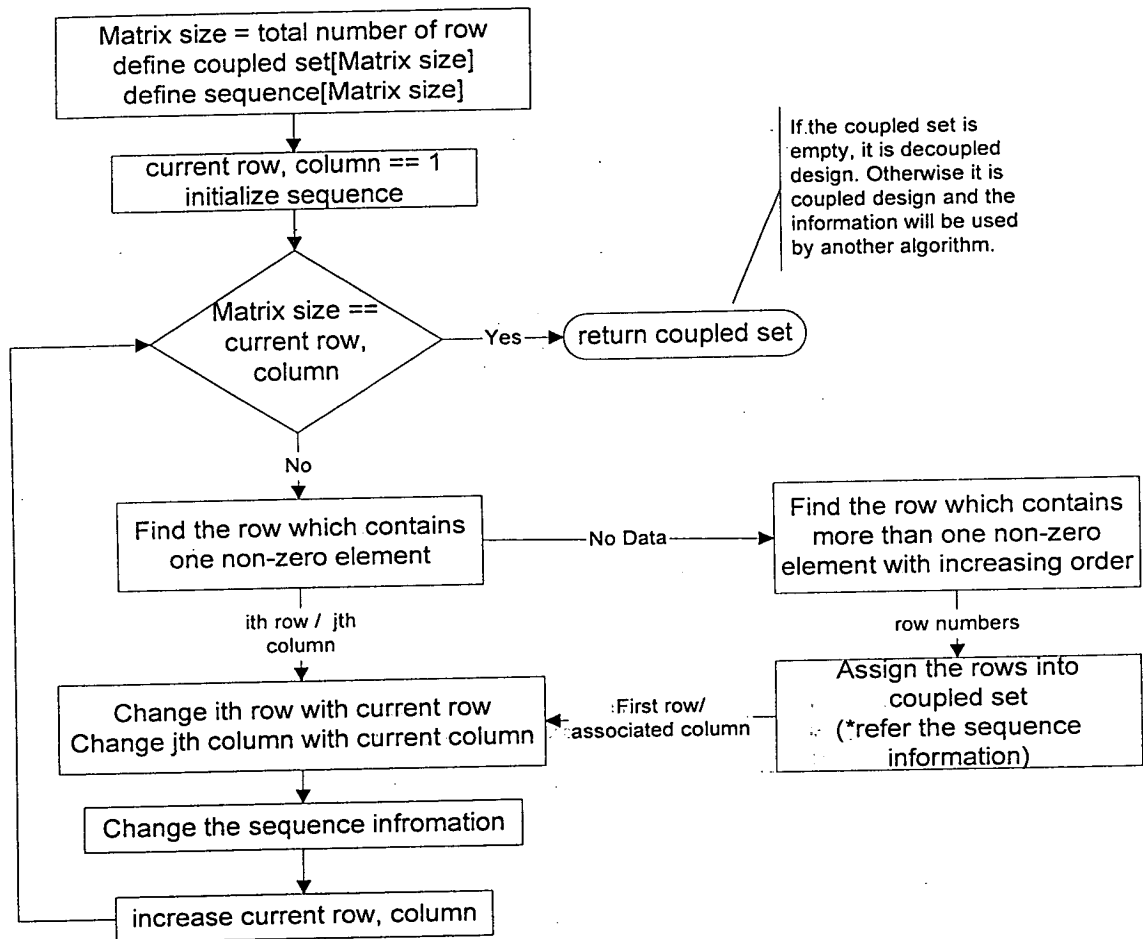


FIGURE 85

003027 0297600

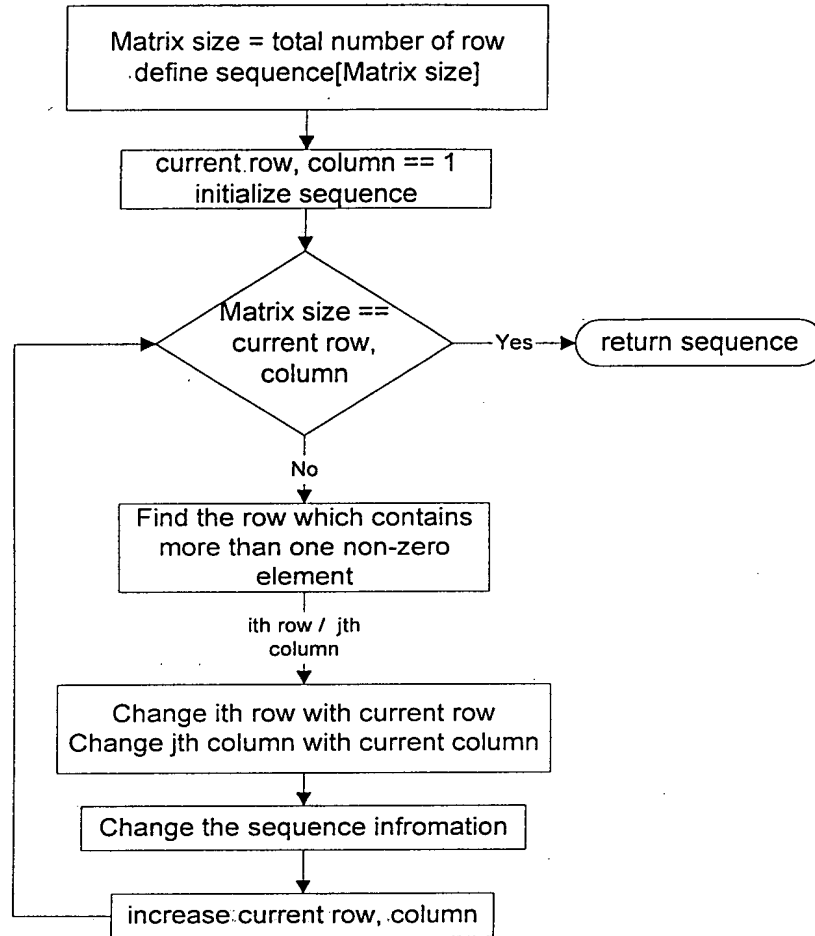


FIGURE 86

005021 0294E 00

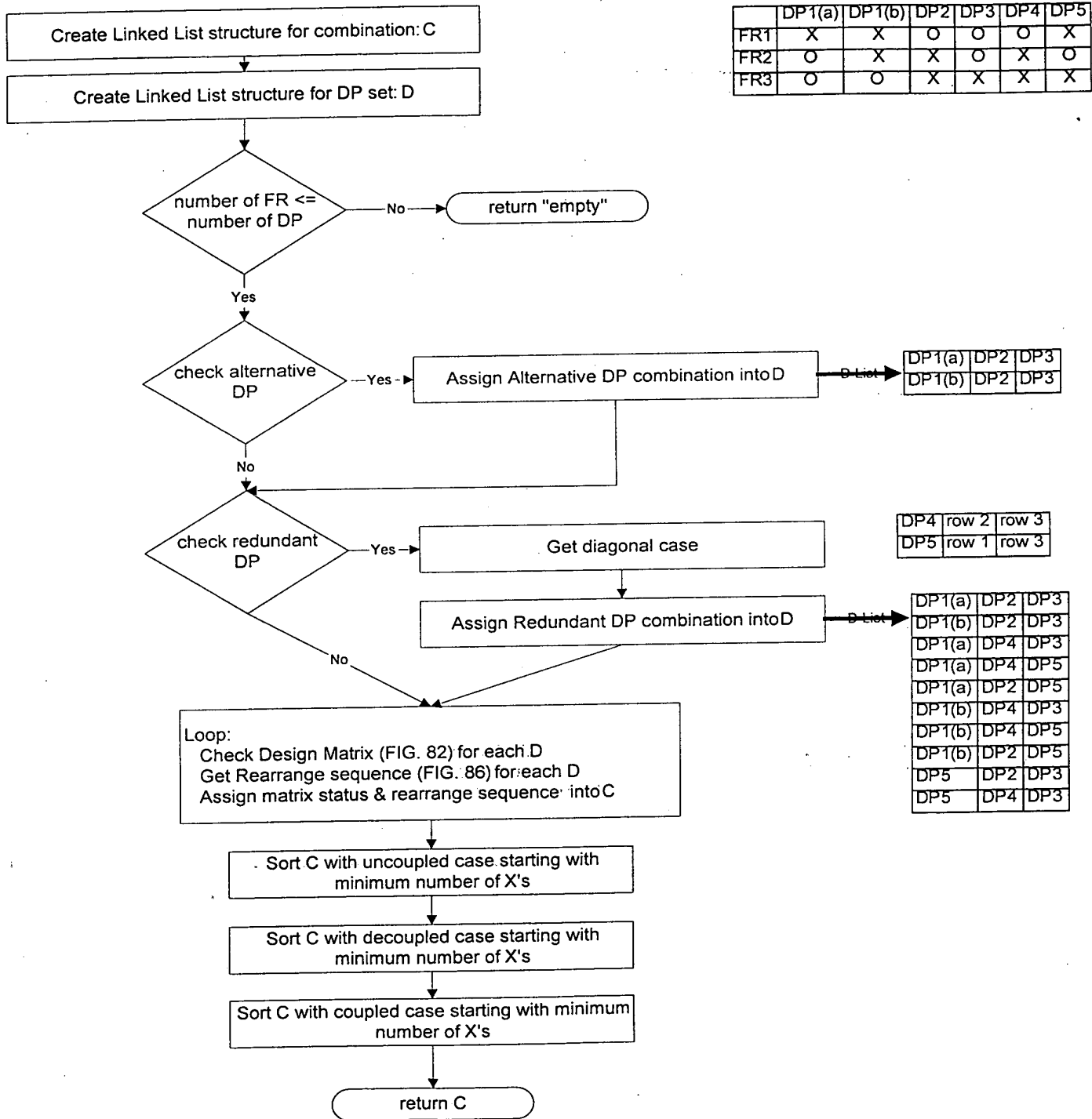


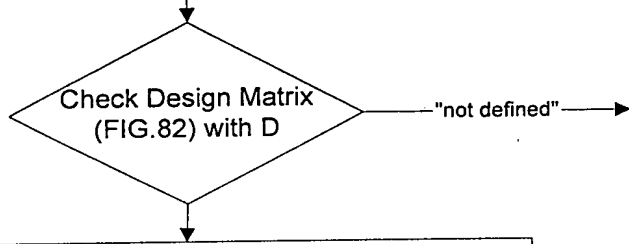
FIGURE 87

000001-0291E-650

Create Linked List structure for combination: C

	DP1(a)	DP1(b)	DP2	DP3	DP4	DP5
FR1	X	X	O	O	O	X
FR2	O	X	X	O	X	O
FR3	O	O	X	X	X	X

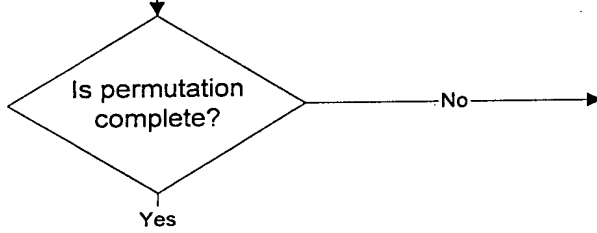
Create one set of DPs based on permutation and combination: D



-Permutation list -

DP1(a)	DP2	DP3
DP1(a)	DP2	DP4
DP1(a)	DP2	DP5
DP1(a)	DP3	DP2
DP1(a)	DP3	DP4
DP1(a)	DP3	DP5
DP1(a)	DP4	DP2
...		
...		
DP3	DP4	DP5

Get Rearrange sequence (FIG. 86) with D
Assign matrix status & rearrange sequence into C



Sort C with uncoupled case starting with minimum number of X's

Sort C with decoupled case starting with minimum number of X's

Sort C with coupled case starting with minimum number of X's

return C

FIGURE 88

000001 02916259

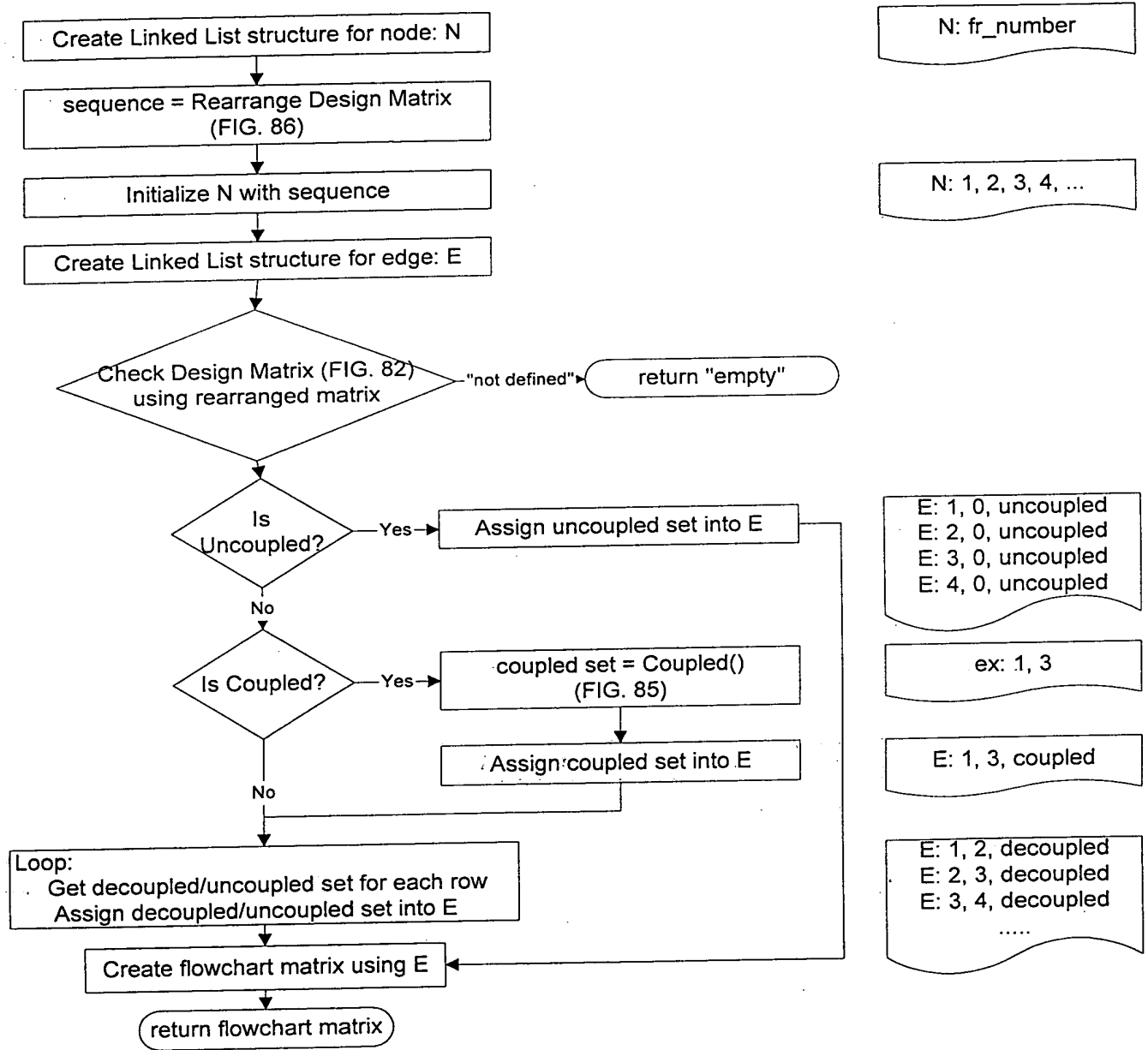


FIGURE 89

	DP1	DP2	DP3
FR1	X	O	O
FR2	O	X	O
FR3	O	X	X

E1: 1, 0, uncoupled
E2: 2, 0, uncoupled
E3: 2, 3, decoupled

1S		
2S	3C	

```

graph LR
    FR1[FR1] -- s --> S[S]
    FR2[FR2] -- c --> FR3[FR3]
    FR3 -- s --> S

```

FIGURE 90

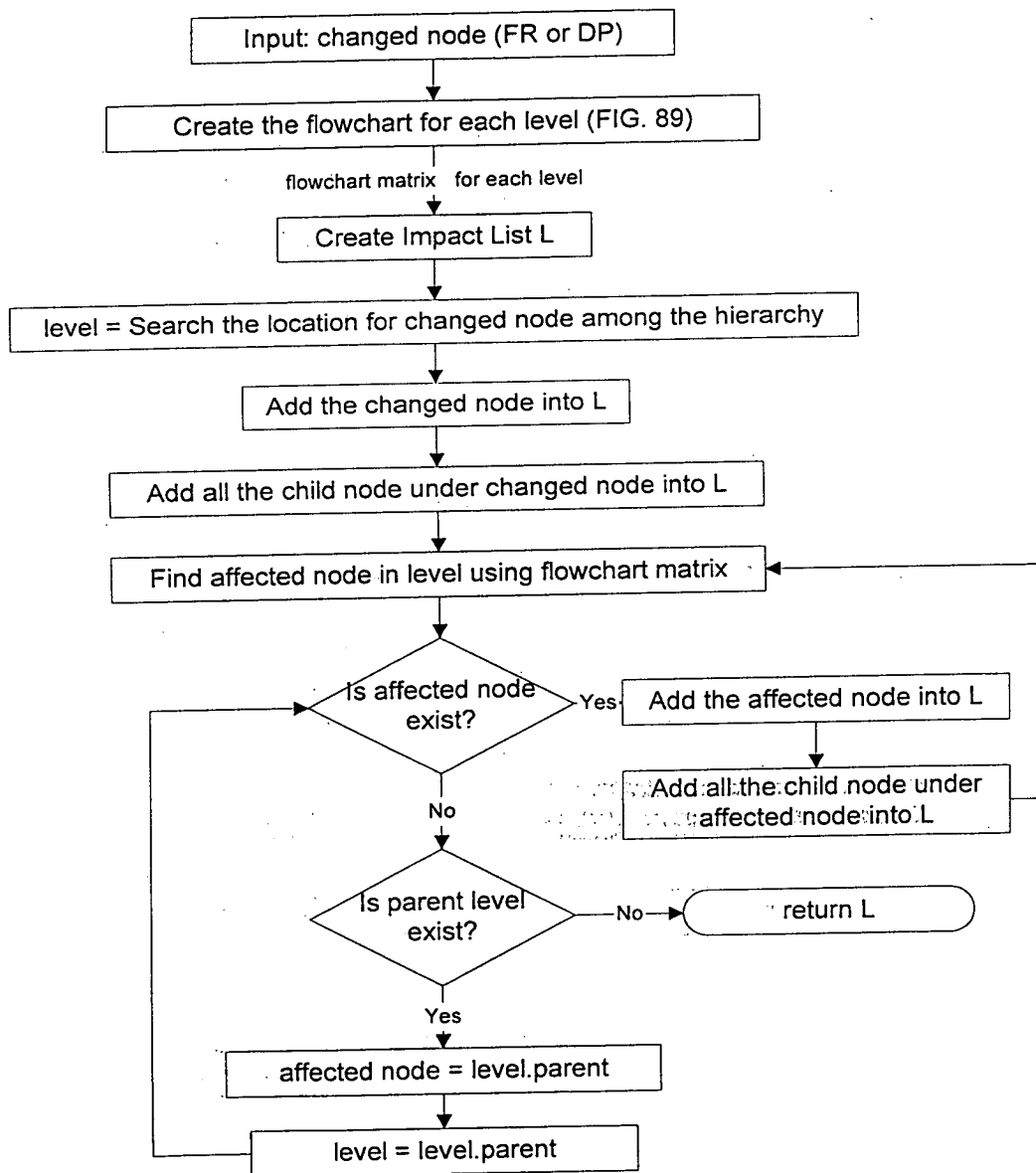


FIGURE 91

009027 0297E200

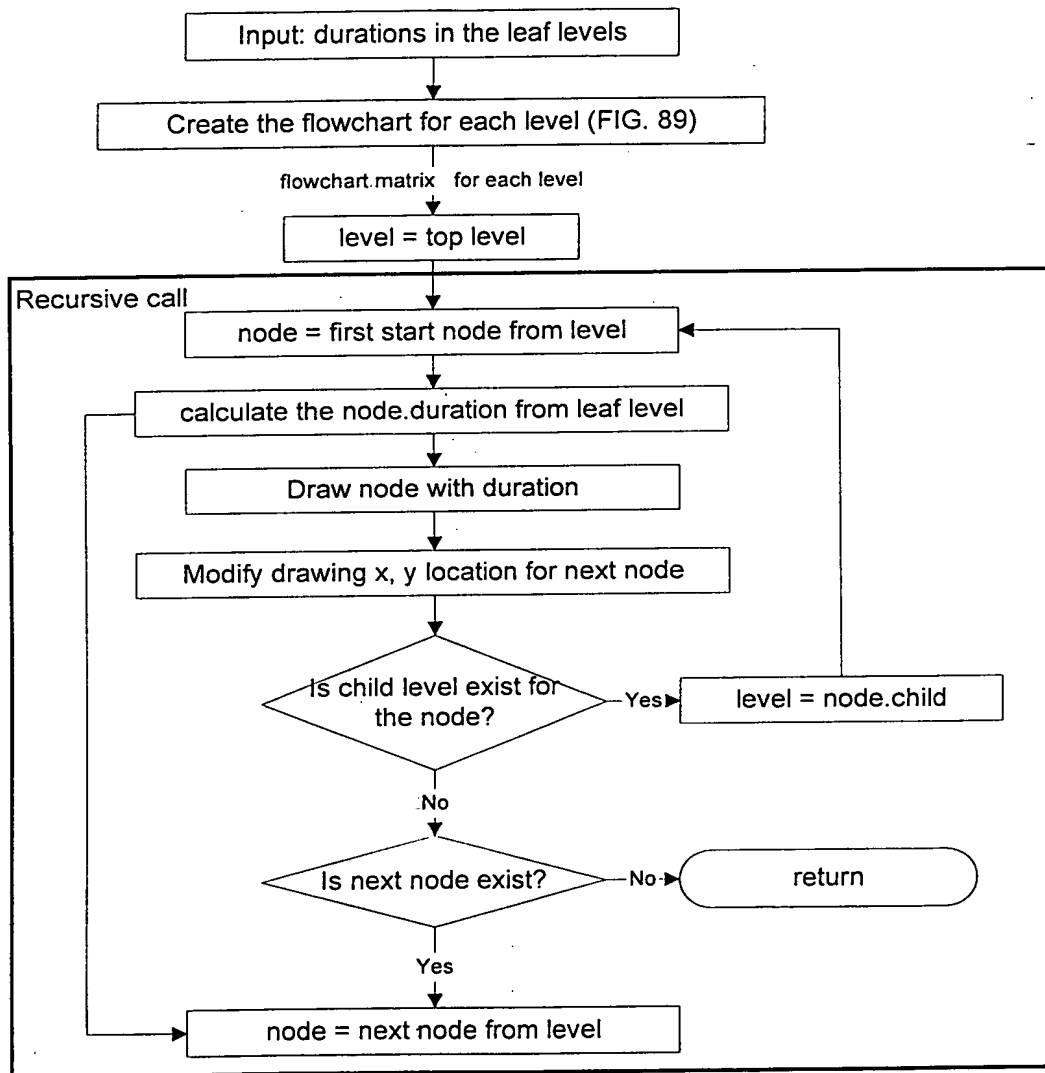


FIGURE 92